# WILDLIFE REVIEW

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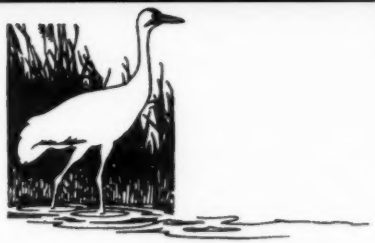

# WILDLIFE REVIEW

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Except as indicated, abstracts are by William H. Stickel, editor.

NATURAL RESOURCES & CLIMATE

Dana, Samuel T., and Myron Krueger. CALIFORNIA LANDS--OWNERSHIP, USE, AND MANAGEMENT. Am. For. Assn., 919 17th St., Wash. 6, D. C. 308 p. 1958. $4.50. [From long review by Monroe Bush, Am. For. 64(8).]

Every state has land-management problems arising from ownership patterns. California has these problems in high degree because of its great diversification, skyrocketing population, and large amounts of public land. Taking Calif. for a pilot study, this book analyzes the problems, particularly as they apply to forestry. The authors do not attempt to provide answers to all problems. One of their conclusions, however, is that Calif. should have a Natural Resources Council that represents all interests and agencies concerned. The Council would continue the study of land and resource ownership, and hence management, far beyond the scope of this book; advise the various arms of the government concerning these matters; and by no means least important, encourage fresh insight and understanding among the special interests represented in its membership. According to Bush, "every state should have such a council. There should be no debate of this question at all."

Eckstein, Otto. (Harvard U.) WATER RESOURCE DEVELOPMENT / THE ECONOMICS OF PROJECT EVALUATION. Harvard U. Press (Cambridge, Mass.), Harvard Econ. Studies 104. 416 p., charts and tables. 1958. $6.50. [From Harvard U. Press catalog, Fall 1958.]

"...a critique of the procedures used by the federal government to justify and evaluate public works in the water resource field. The methods of measuring benefits and costs that have been devised for projects in the fields of flood control, irrigation, navigation, and electric power are examined from the point of view of the theory of welfare economics. The major sources of bias are identified, and suggestions are made to improve the evaluation practices. The author concludes that benefit-cost analysis could become a reliable test for measuring the effect of projects on economic welfare, but that the present procedures overstate benefits and understate costs to such an extent that the economic justification of many of the projects in the present program must be called into question. The suggestions for changes which are made are designed to raise the standards of project evaluation to a point where the public and the Congress can have some assurance that the projects will raise the economic welfare of the country."

Francis, Roy G., editor. THE POPULATION AHEAD. U. Minn. Press, Minneapolis 14. 160 p., illus. 1958. $3.75. [From Sci. News Letter 73(25).]

"Papers read at the Second Symposium on Population Problems held in 1957 at the Center for Continuation Study of the University of Minnesota."

Haber, David, and Stephen W. Bergen, editors. THE LAW OF WATER ALLOCATION IN THE EASTERN UNITED STATES. Ronald Press, 15 E. 26th St., N. Y. 643 p. 1958. $7.50, paper. [From Sport Fishing Inst. Bul. no. 81.]

"A valuable compendium for those who are concerned with state water rights legislation and water allocation policy, compiled by the Conservation Foundation from papers and statements given at a symposium in October, 1956."

Krutilla, John V., and Otto Eckstein. MULTIPLE PURPOSE RIVER DEVELOPMENT / STUDIES IN APPLIED ECONOMIC ANALYSIS. Johns Hopkins U. Press, Baltimore, Md. 301 p. 1958. $4.50. [From Sport Fishing Inst. Bul. no. 81.]

"This study, sponsored by Resources For The Future, Inc., explores the differences in costs and gains under alternative policies applied to river basin developments. The authors evaluate the public-private 'partnership' approach currently advanced in this highly-controversial field."

Osborn, Frederick. POPULATION: AN INTERNATIONAL DILEMMA. Population Council. 97 p., graphs. 1958. $2.00. [From Sci. News Letter 73(25).]

"A summary of the proceedings of the Conference Committee on Population Problems--1956-1957."

Shepard, Paul H., Jr. (Knox Coll., Galesburg, Ill.) THE PLACE OF NATURE IN MAN'S WORLD. School Science and Mathematics 57(5): 394-403. May 1958.

Conventional notions of the objectives and definitions of conservation are of doubtful ecological validity. Instances are cited in which good management of 1 resource is destructive to others, indicating the difficulties of compartmentalized conservation. The trend toward environmental control on an ever larger scale may not be the solution, since we are already tinkering with processes about which we know very little. Over-emphasis on technique has left conservation without adequate philosophical or theoretical development. Attitudes are as important as methods. An approach in more humility seems appropriate, such as that exemplified in a recent statement by Alfred Etter (Sat. Rev. Lit., Oct. 6, 1956). Such an approach to resource management would not be guilty of failing to conserve "useless" organisms along with harvested forms. We now face two major conservation problems: a population explosion, and the poisoning of our environment. As to poisons, the "maximum safe dosage" standard of human consumption is a false criterion of safety. Two recommendations are made for providing a margin of safety in manipulating landscapes: land-use planning based to at least a minimum on natural vegetational type (e.g., tree farming in areas climatically best suited to forest); and a system of natural areas representing all vegetational types as standards against which to measure the strains we put on the habitat.--Author.

Smith, Guy-Harold, editor. CONSERVATION OF NATURAL RESOURCES. 2d edition. John Wiley & Sons, 440 4th Ave., N. Y. 16, N. Y. xi + 474 p., illus. 1958. $8.50.

One of the finest works in the conservation field. Smith, who wrote 5 of the 23 chapters, and his 18 expert coauthors have produced an excellent, up-to-date discussion of conservation in the U. S. Intended primarily as a college text, the book is an admirable reference. Experts can profit greatly from the chapters that do not deal with their own specialties. The book is factual without being too heavy, readable without being flip or sensational, well rounded without being too detailed or too statistical. Controversies are neither ignored nor dramatized. Human population problems are considered. Depletion of minerals and fuels is treated scientifically. On the other hand, natural areas receive far less attention than they should; interests of the authors obviously are in wise use and sound development rather than in preservation. Our only other general criticism is that the world outside the U. S. is hardly mentioned. Perhaps the strongest feature of the book is that many kinds of resources are given highly informative professional treatment, with depth and perspective. Part 1 outlines the history of conservation in the U. S., discusses the public domain and its disposition, and reviews the relationship of economics to conservation. Part 2 covers the soil groups and their uses, soil conservation, irrigation, reclamation of wet lands, grassland resources, and human population changes in relation to land-use. Part 3 covers forest resources and forest conservation. Part 4 deals with water supply, water power, waterways, and flood control. Part 5 is on minerals and fuels. Part 6 has 1 chapter on wildlife, by C. A. Dambach, and 1 on fisheries, by H. H. Martin. Part 7 treats recreational and human resources. Part 8 considers planning for conservation on local, state, and national levels. The volume has an index. Selected references are cited throughout and a number of general works on conservation are listed at the end.

Symposium. MAN AND THE WATERS OF THE UPPER OHIO BASIN. Pymatuning Lab. Field Biol., Spec. Publ. no. 1. v + 100 p., 23 figs. Feb. 1956. Price not stated.

Contains the following papers: Water as a problem in human ecology, by C. A. Tryon, Jr., and M. A. Shapiro. Geography of the Upper Ohio Valley, by M. G. Netting. Source and quantity of water in the Upper Ohio Basin, by J. W. Mangan. Quality of water in the Upper Ohio River Basin, by S. K. Love. Vegetative changes and the waters of the Upper Ohio Basin, by O. D. Diller. The changing fish fauna of the Upper Ohio Basin, by E. A. Lachner. The role of catastrophes in the ecological succession and evolution of fishes, by T. H. Langlois. Modern industrial society and the waters of the Ohio Basin, by M. M. Cohn.

Various authors. RESOURCE TRAINING FOR BUSINESS, INDUSTRY, GOVERNMENT. Conservation Foundation, 30 E. 40th St., N. Y. 16, N. Y. 159 p. 1958. Price not stated. [From Sport Fishing Inst. Bul. no. 81. Long review by Monroe Bush in Am. For., Sept. 1958.]

"...essays by various prominent conservationists on the importance of adequately informing lawyers, economists, planners, legislators, and others responsible for putting knowledge of resource scientists into action."

Walford, Lionel A. (US F&WS.) LIVING RESOURCES OF THE SEA / OPPORTUNITIES FOR RESEARCH AND EXPANSION. A Conservation Foundation Study. Ronald Press, 15 E. 26th St., N. Y. 10, N. Y. xv + 321 p., 23 maps. 1958. $6.00.

This book is not a compendium of the fisheries field, but a practical, scholarly review of problems and research needs facing an important world resource. The most recent techniques, scientific opinions, and practical difficulties are placed in perspective. In his outlook for the future, Walford is not optimistic that the harvest from the sea can be multiplied many times. In fact, he believes it scarcely can be doubled. He points up the need, however, to devise ways to avoid fisheries failures that result in capital loss to fishermen and perhaps famine to those who depend upon the catch. In Part I he discusses many problems on which research is needed and points out possibilities for expanding harvests. He considers the circumstances of underdeveloped countries throughout the book. In Part II he discusses the resources of the sea under such headings as Invertebrate Animals, Fishes, Reptiles, Marine Mammals and Sea Weeds. To the reviewer, the most important contribution of the book is its vigorous advocacy of basic research as a means of expanding knowledge for practical goals. Walford fully recognizes the need for applied research, but asks for far more attention to research toward new and integrated understanding. The book certainly should be in the library of every serious fishery worker and we recommend it to those in wildlife management and research, where many of the basic ideas will hold almost as well as they do in the field of commercial fisheries. Taxonomists and ecologists will find in the book one of the strongest explanations we have ever seen of the essentialness of their fields. The volume has a short list of references for each chapter and a good index.--Fred H. Dale.

## SOILS

Arneman, H. F., and others. FARIBAULT COUNTY, MINNESOTA, SOILS. US Soil Cons. Serv., Soil Surv. Ser. 1947, no. 2. iv + 73 p., 12 figs. + large folding maps. Jan. 1957 [Rec'd. Aug. 1958]. Sold by Supt. Documents.

Buchanan, D. E., and others. SOIL SURVEY OF CURRY COUNTY, NEW MEXICO. US Soil Cons. Serv., Ser. 1953, no. 4. 1-40 p., 26 figs. + large single-fold maps based on aerial photos and bound in. Sept. 1958. Sold by Supt. Documents.

Cowles, D. A., and others. SOIL SURVEY OF FILLMORE COUNTY, MINNESOTA. US Soil Cons. Serv., Ser. 1954, no. 1. ii + 51 p., 5 figs., + large single-fold maps based on aerial photos and bound in. Aug. 1958. Sold by Supt. Documents.

Donahue, Roy L. SOILS: AN INTRODUCTION TO SOILS AND PLANT GROWTH. Prentice-Hall, Inc., Englewood Cliffs, N. J. 349 p., illus. 1958. $6.75. [From review by C. E. Kellogg, Soil Cons. 24(1).]

"Books on general soil science that are both balanced and simple are very scarce. Dr. Donahue has given us a good one. He sets out the main principles and examples of their practical application with an economy of words. Knowledge of chemistry beyond the meaning of the chemical symbols is not required. In about 130 pages he deals simply and effectively with fundamental principles; 182 pages are devoted to soil management and conservation; and, the rest is used for glossary and index. ...he has done the job well in terms of the most important current ideas. This book should be especially good for elementary text or as a reader for those needing a general review of the subject without extensive scientific preparation. The text is unusually well-illustrated with photographs, simple charts, and drawings."

SOILS--Continued

Edwards, Max J., and others. SOIL SURVEY OF GREENE COUNTY, TENNESSEE. US Soil Cons. Serv., Ser. 1947, no. 7. ii + 80 p., 16 figs., + large single-fold maps based on aerial photos and bound in. Aug. 1958. Sold by Supt. Documents.

Fox, C. J., and others. SOIL SURVEY OF BRADLEY COUNTY, TENNESSEE. US Soil Cons. Serv., Ser. 1951, no. 2. ii + 94 p., 6 figs. + large single-fold maps based on aerial photos and bound in. July 1958. Sold by Supt. Documents.

Gardner, R. A., and others. SOIL SURVEY OF THE SANTA CLARA AREA, CALIFORNIA. US Soil Cons. Serv., Ser. 1941, no. 17. 1-202 p., 9 pl., 7 figs. + large folding maps. June 1958. Sold by Supt. Documents.

Leighty, W. J., and others. SOIL SURVEY OF WATAUGA COUNTY, NORTH CAROLINA. US Soil Cons. Serv., Ser. 1944, no. 5. i + 75 p., 22 figs. + large single-fold maps based on aerial photos and bound in. June 1958. Sold by Supt. Documents.

Mowery, Irvin C., and others. SOIL SURVEY OF BRAZOS COUNTY, TEXAS. US Soil Cons. Serv., Ser. 1951, no. 1. 65 p., 10 figs. + large single-fold maps based on aerial photos and bound in. June 1958. $2.50 from Supt. Documents.
The many large maps (scale 1:20,000) and the large amount of information on the county and its soils, make a volume of this type of high value in wildlife work.

Ness, A. O., and others. SOIL SURVEY OF ISLAND COUNTY, WASHINGTON. US Soil Cons. Serv., Ser. 1949, no. 6. 1-58 p., 8 figs. + large, colored, single-fold maps bound in. Aug. 1958. Sold by Supt. Documents.

Patton, Boyd J., and others. SOIL SURVEY OF CLARION COUNTY, PENNSYLVANIA. US Soil Cons. Serv., Ser. 1955, no. 1. ii + 62 p., 9 figs. + large single-fold maps based on aerial photos and bound in. July 1958. Sold by Supt. Documents.

Robinson, Glenn H., and others. SOIL SURVEY OF BARRON COUNTY, WISCONSIN. US Soil Cons. Serv., Ser. 1948, no. 1. 1-103 p., 13 figs. + large folding maps. Aug. 1958. Sold by Supt. Documents.

Scholtes, W. H., and others. SOIL SURVEY OF ALLAMAKEE COUNTY, IOWA. US Soil Cons. Serv., Ser. 1939, no. 29. 1-51 p., 8 figs. + large folding maps. Aug. 1958. Sold by Supt. Documents.

CONSERVATION EDUCATION

Barber, Lunette, and Wm. Hamnett. A GUIDE FOR TEACHING WILDLIFE CONSERVATION. N. C. Wildl. Resources Comm. 68 p., illus., paper cover. No date. No price stated.
This booklet should be a real aid to teachers in N. C. It begins by telling why conservation is important and how it can be taught. History and organization of wildlife conservation in N. C. are covered concisely. Many pages are devoted to life history, habits, and management needs of game and fur animals; these sections are interestingly written and have state range maps. Bird migration and flyways are discussed in a few pages. Fishes are introduced by telling about several common fishes of fresh water and by answering common questions about fish biology. Protection of hawks and owls is treated partly by a food habits chart. A large part of the pamphlet tells of conservation or natural history projects that can be carried out by individual children or groups of children. Some are suitable for the classroom, others are for the out-of-doors. In general, the intent of the paper is to create a self-sustaining interest in wildlife that will lead to participation in natural history and conservation activities. The authors wisely recognize that one of the best approaches to conservation is through interest in natural history.

## BIBLIOGRAPHIES, DIRECTORIES, BIOGRAPHY, HISTORY

Allen, Milford Francis. UNITED STATES GOVERNMENT EXPLORING EXPEDITIONS AND NATURAL HISTORY, 1800-1840. Ph.D. thesis, U. Texas. 252 p. 1958. [From Dissertation Abstracts 18(6).]

Bates, J. Leonard. FULFILLING AMERICAN DEMOCRACY: THE CONSERVATION MOVEMENT, 1907-1921. Miss. Valley Historical Rev. 44(1): 29-57. June 1957. $1.25 for issue, from Miss. Valley Hist. Assn., 1500 R St., Lincoln, Nebr. [From J. Soil & Water Cons. 13(5).]

"J. Leonard Bates is assistant professor of history in the University of Illinois. He has prepared a scholarly discussion that is helpful in obtaining an understanding of the development and growth of the conservation movement, and the agencies, organizations and individuals involved." His conclusion: "The faith [conservation policy] was genuine; the propaganda effective. Though a careful evaluation of the impact upon this country remains to be made, it is difficult to escape the conclusion that a fighting band of conservationists has made the United States much richer in material wealth and in the democratic spirit and faith of its people."

Brandborg, Stewart M., and James S. Pacy, compilers. THE CONSERVATION DIRECTORY / A LISTING OF ORGANIZATIONS AND OFFICIALS CONCERNED WITH THE PROTECTION OF WILDLIFE AND OTHER NATURAL RESOURCES. Natl. Wildl. Fed., 232 Carroll St. NW., Wash. 12, D. C. vii + 109 p. July 1958. 50¢.

Very useful guide and address list. We keep several copies around the building.

Stratton, G. Burder, editor. THE ZOOLOGICAL RECORD / VOLUME THE NINETY-SECOND / BEING THE RECORDS OF ZOOLOGICAL LITERATURE RELATING CHIEFLY TO THE YEAR 1955. Zool. Soc. London. 1958. $25.60.

This is probably the most useful bibliographic series in zoology. Few if any series can equal it in completeness of coverage of the literature. Wildlife workers can find a great deal of value in it, especially in the sections on birds (112 p.) and mammals (129 p.). There are, of course, sections on all groups of animals. Each section is separately paged, cross-indexed, and may be purchased separately. Price of the bird and mammal sections is only 10s. each.

WEED ABSTRACTS. "Prepared monthly by the Information Section, Agricultural Research Council, Unit of Experimental Agronomy, Department of Agriculture, Parks Road, Oxford, England, and distributed by British Weed Control Council, 58, Mark Lane, London, E.C. 3." Vol. 7, no. 9, 54 p., mimeo., Sept. 1958. Subscription price not stated.

An exceedingly informative series that provides factual abstracts of a wide range of papers. Coverage of U. S. published and semipublished series, such as regional weed control conference proceedings, is excellent. Entries are grouped under such headings as "Aquatic and woody weeds and their control" and "Chemistry, physics and toxicology of herbicides." As the publisher states, "Weed Abstracts endeavors to provide a comprehensive coverage of the world's literature on weeds, weed control and closely allied subjects. To this end over 370 journals and nearly 100 annual reports are regularly searched. Other journals, reports, bulletins, etc. are abstracted as they are seen. Additional coverage is obtained through agreements with other abstracting organisations."

## PLANTS--GENERAL, ECOLOGY, TECHNIQUES

Benninghoff, Wm. S. (US Geol. Surv., Wash., D. C.) RECENT CONTRIBUTIONS TO QUATERNARY VEGETATION HISTORY IN ALASKA. Sci. in Alaska 1954. p. 28. 1957.

Abstract only.

Churchill, E. D., and H. C. Hanson. (Catholic U. of Am., Wash., D. C.) THE CONCEPT OF CLIMAX IN ARCTIC AND ALPINE VEGETATION. Bot. Rev. 24(2/3): 127-191. 1958. [From J. Range Mgt. 11(4).]

Drury, H. F., and S. G. Smith. (Arctic Aeromed. Lab., Ladd A.F.B., Alaska.) ALASKAN WILD PLANTS AS AN EMERGENCY FOOD SOURCE. Sci. in Alaska 1953. p. 155-159. 1956.

Includes data on nutritive values of several plants.

PLANTS--GENERAL, ECOLOGY, TECHNIQUES--Continued

Ellenberg, Heinz. NEW DIRECTIONS OF RESEARCH IN THE STUDY OF VEGETATION. Ber. deutsch. bot. Ges. 70(2): 51-56. 1957. [From Biol. Abs. 32(8).]
In German. An account of current developments. The importance of the individual plant or species in the study of vegetation is being increasingly recognized; chorological data are also being taken into account. Attitudes adopted to the classification of vegetation are becoming less dogmatic, individual stands of an association being regarded as similar rather than genetically related. Different methods of classification are recognized as valid for particular purposes. The hypothetical character of much succession theory has been exposed, many supposed examples of succession being no more than zonation. Analytical and experimental studies are now bulking much larger in the study of vegetation than in earlier years, and more attention is being paid to subspecific systematic units, and to lower plants.--D. W. Goodall.

Fernald, Merritt L., and Alfred C. Kinsey. Revised by Reed C. Rollins. EDIBLE WILD PLANTS OF EASTERN NORTH AMERICA. Harper & Bros., N. Y. xiii + 452 p., 129 figs., 25 pl. 1943, revised 1958. $6.00.
Authoritative and comprehensive reference that presents a wealth of evaluated and documented information. The thoroughly scientific approach is satisfying: all edible plants are not endorsed indiscriminately; instead each is evaluated for palatability and its best uses are stated. Occasional notes from the journals of travelers add to the interest of the text. Chapter I takes up plants by uses: soups, cereals, greens, salads, pickles, seasonings, drinks, rennets, confections, preserves, oils, gums, etc. For each plant recommended in this chapter, a page reference is given to chapter III, where plants and the details of their utilization are discussed group by group. This chapter includes information on recognition and distribution. Chapter IV is a similar discussion of mushrooms, seaweeds, and lichens. Chapter II is a good treatment of poisonous plants that should not be confused with edible ones. The book closes with bibliography, list of illustrations, and index. The present edition differs from the first mainly in having the taxonomy brought up to date, for few changes in the text were needed.--L. F. Stickel.

Hanson, H. C. (Catholic U. of Am., Wash., D. C.) PRINCIPLES CONCERNED IN THE FORMATION AND CLASSIFICATION OF COMMUNITIES. Bot. Rev. 24(2/3): 65-127. 1958. [From J. Range Mgt. 11(4).]

Hoffmann, Robert S. (Mont. State U., Missoula.) THE MEANING OF THE WORD "TAIGA". Ecology 39(3): 540-541. July 1958.
According to consistent Russian usage, the term "taiga" should be applied to the northern coniferous forest, not merely to the ecotone between this forest and tundra. Various definitions are quoted.

PLANTS--FLORAS, COMMUNITIES, TAXONOMY

Bailey, Virginia Long. (Wayne U., Detroit, Mich.) A GUIDE TO THE FLOWERING PLANTS AND FERNS OF THE WESTERN NATIONAL PARKS. PART 5. ANGIOSPERMS: DICOTYLEDONS (SALICACEAE). Am. Midl. Nat. 59(2): 438-451. June 1958.
Technical keys to poplars and willows, with indication of parks in which each species occurs.

Budd, Archibald C. (Exp. Farm, Swift Current, Sask.) WILD PLANTS OF THE CANADIAN PRAIRIES. Can. Dept. Agr., Exp. Farms Serv., Publ. 983. iii + 348 p., 50 pl. Mar. 1957. $1.50, paper, from Queen's Printer, Ottawa.
We believe this flora should be very useful to anyone working in the n. prairies. "...written to supply the need for a reasonably correct, and yet easily understood, guide for the identification of wild plants found on the prairies... Although considerably revised and several species added, it is not claimed to be a complete flora nor is it claimed to be entirely up to date, especially in the matter of modern scientific nomenclature... ...the writer's purpose has been to use the more familiar scientific names where possible... Keys for identification and an illustrated glossary are included. The keys have been made as practical and simple as possible. They have been tested and revised where necessary and it is believed that they will prove useful... Emphasis has

been put on the outstanding field characters of the plants described and on their distribution and habits. Technical terms have been avoided so far as possible, but they have been used where it was necessary to present accurate descriptions. Approximately 1,200 species...are described. All species that are commonly seen in the area are included, except the less common sedges and willows... Introduced weeds have been included so far as possible... This handbook has been prepared with particular consideration of the requirements of interested field men." Keys appear to be well constructed and technical enough to be workable. They are of the desirable type, compact dichotomous. Species accounts provide short descriptions, common names, and minimal indication of habitat, distribution in area, and abundance. The 50 drawings or sets of drawings by the author assist in use of the book. Indexes to common and scientific names are supplied.

Froiland, Sven Gordon. THE GENUS SALIX IN THE BLACK HILLS OF SOUTH DAKOTA: A PHYTOGEOGRAPHICAL STUDY. Ph.D. thesis, U. Colo. 264 p. 1957. [From long abstract in Dissertation Abstracts 19(1).]

The central portion of the Black-Hills region is the "willow zone". Twenty-one species or varieties were collected; these included representatives of the various phytogeographic regions that come together in the Black Hills. The paper includes taxonomic descriptions of the willow species, a key based on vegetative characters, notes on field identification, distribution maps, photographs, and notes on site requirements, vigor, and abundance.

Goodman, George J. SPRING FLORA OF CENTRAL OKLAHOMA. U. Okla. Duplicating Serv., Norman. 126 p. 1958. $3.35, paper. [From review by R. C. Rollins, Rhodora 60(716).]

"...has keys to the families, genera and species which bloom before June 1st in the central area of Oklahoma... ...it is a valuable addition to the floras covering portions of the United States. There are short notes on habitats and geographic ranges under each listed species."

Harlow, Wm. M., and Ellwood S. Harrar. TEXTBOOK OF DENDROLOGY. 4th ed. McGraw-Hill, N. Y. 561 p., illus. 1958. $8.75. [From J. For. 56(8).]

"Like its predecessors, the fourth edition...describes for beginning students of forestry the important forest trees of the United States and Canada." Taxonomy has been brought up to date. "The range maps have been completely reworked, and the book is illustrated by approximately 1,000 photographic halftones. A list of state trees is appended."

Horner, Chester E., and Ernest S. Booth. SPRING FLOWERS OF SOUTHEASTERN WASHINGTON AND NORTHEASTERN OREGON. Walla Walla Coll. Publ. 3(1): 1-172. 1952. [From Biol. Abs. 32(7).]

Contains a key to families, descriptions of species, glossary, an index, and numerous illustrations of plants.

Howell, John Thomas, Peter H. Raven, and Peter Rubtzoff. (Calif. Acad. Sci., San Francisco 18.) A FLORA OF SAN FRANCISCO, CALIFORNIA. Wasmann J. Biol. 16 (1): 1-157, 20 figs. Spring 1958. $3.00 in book form from Bookstore, 2130 Fulton St., San Francisco 17, Calif.

The city of San Francisco has covered its county and is using up most of its few remaining open areas. This flora was prepared to show what botanical conditions were and are while samples of native vegetation remain. An introduction describes the habitats and changes in them. The bulk of the paper is a catalog of ferns and seed plants. Scientific and common names, habitat, and collection records are given for each species. Comments on relative abundance, taxonomy, or introduction are given for some taxa.

Hyland, Fay, and Ferdinand H. Steinmetz. THE WOODY PLANTS OF MAINE, THEIR OCCURRENCE AND DISTRIBUTION. U. Maine Studies, 2d Ser., no. 59. 96 p. 1944. $1.00 from U. Maine Library, Orono.

Küchler, A. W. NOTES ON THE VEGETATION OF SOUTHEASTERN MOUNT DESERT ISLAND, MAINE. U. Kans. Sci. Bul. 38(1): 335-392, map. 1956. [From Biol. Abs. 32(7).]
The vegetation was mapped at 1:25,000 and the physiognomy and floristic composition of each plant community recorded. For each species the coverage and sociability are given. These data are presented in tabular form with a brief comment explaining the methods employed and some observations made in the field. --Auth. abst.

McCoy, Doyle Allen. (State Coll., Ada, Okla.) VASCULAR PLANTS OF PONTOTOC COUNTY, OKLAHOMA. Am. Midl. Nat. 59(2): 371-396. Apr. 1958.
Describes the county and its major associations and discusses its floristic relationships. A list of plants, without annotations, forms the bulk of the paper.

McVaugh, Rogers. (Bot. Dept., U. Mich., Ann Arbor.) FLORA OF THE COLUMBIA COUNTY AREA, NEW YORK. N. Y. State Mus. & Sci. Serv. (Albany 1), Bul. no. 360. 1-400 p., 81 figs. Apr. 1958. (Bul. no. 360A, p. 401-433, Apr. 1958, is index to Bul. 360.) $4.00, paper, for Flora and Index.
An exceptionally impressive, useful, and important local flora that includes both keys and large amounts of ecological information. The area covered is "bounded on the west by the Hudson River and on the east by the summits of the Taconic Mountains. It includes all of Columbia County, N. Y., and smaller adjoining portions of Rensselaer and Dutchess Counties, N. Y., and Berkshire County, Mass." The first section of the book, p. 25-231, is a systematic manual of ferns and higher plants with keys and species accounts. Keys are technical and appear well constructed. Species accounts include: common names (if accepted as having popular usage); statements of habitats, abundance, and frequency; and statements of local distribution and/or localities. Part 2, p. 233-391, is a detailed description of the area and its vegetation. Here geology, soils, climate, and history of settlement and botanical exploration are considered at length. Vegetation is discussed in much detail, with descriptions of the associations, their successions and local manifestations and variations. Geographic derivation of the flora is also discussed at length, with consideration of habitat restrictions, local distribution (maps), and invasion routes of many of the species.

Porsild, A. E. ILLUSTRATED FLORA OF THE CANADIAN ARCTIC ARCHIPELAGO. Natl. Mus. Can., Bul. no. 146: Biol. Ser. no. 50. iii + 209 p., illus. 1957. $2.00 from Queen's Printer, Ottawa. [From Nature, Aug. 2, 1958.]
Describes the physiography, soils, and plant habitats of this vast region. "...numerous illustrations, species distribution maps and keys are provided. In all, some 340 species and major geographical races of flowering plants and pteridophytes are described."

Potzger, John E., Margaret E. Potzger, and Jack McCormick. (Am. Mus. Nat. Hist., N. Y. 24.) THE FOREST PRIMEVAL OF INDIANA AS RECORDED IN THE ORIGINAL U. S. LAND SURVEYS AND AN EVALUATION OF PREVIOUS INTERPRETATIONS OF INDIANA VEGETATION. Butler U. Bot. Stud. 13(1): 95-111. 1956. [From Biol. Abs. 32(7).]
See abs. in Biol. Abs. 32(7).

Scoggan, H. J. FLORA OF MANITOBA. Natl. Mus. Can. Bul. no. 140. 619 p. 1957. $5.00 from Queen's Printer, Ottawa. [From long review by J. C. Ritchie, Can. Field-Nat. 72(3).]
Valuable technical manual that includes many new records. Introductory sections take up previous work, physiography of province, climate and vegetation, and floral affinities. The main portion consists of keys to all groups of higher plants. Given for each kind of plant are synonymy, brief comments on ecology, notes on distribution in province, and statement of general distribution. The keys are technical. The taxonomy is conservative.

PLANTS--FLORAS, COMMUNITIES, TAXONOMY--Continued

Shinners, Lloyd H. SPRING FLORA OF THE DALLAS-FORT WORTH AREA, TEXAS. Publ. by author. 514 p. 1958. $5.50 [+ 25¢ postage], paper, from author, S.M.U., Box 473, Dallas 5, Texas. [From review by R. C. Rollins, Rhodora 60(716).]

Covers 10 counties, but is applicable to a wider area. Includes mainly plants that bloom between Jan. 1 and June 1. "There are keys to the families, genera and species, and notes on outstanding characteristics, habitats, geographical distribution and blooming dates. Much of the originality in the book is found in the appendices where one finds a discussion of technical terms, the use of keys, scientific and common names, pronunciation, rules of nomenclature, collecting herbarium specimens, natural history of plants, conservation and notes on the background of the book."

Stearns, Forest. (Purdue U., Lafayette, Indiana.) FOREST COMMUNITIES IN VERSAILLES STATE PARK, INDIANA. Butler U. Bot. Stud. 13(1): 85-94. 1956. [From Biol. Abs. 32(7).]

See abs. in Biol. Abs. 32(7).

PLANTS--FOREST SURVEYS

Anon. MISSISSIPPI FORESTS. US For. Serv., S. For. Exp. Sta. (New Orleans 13, La.), For. Surv. Rel. 81. iv + 52 p., illus. 1958.

A thorough report of the 3d survey. Comparisons are made with data of the 1948 survey. A forest-type map is included. Forests covered 17 of the state's 30 million acres, an increase of 4%. Pulp production reached new highs. Sawmills were fewer but larger and made better use of wood wastes. More pine was being grown than was being cut. Hardwoods, however, were losing ground. Softwood sawtimber volume increased 9% owing to forest management, fire control, and planting. Hardwood sawtimber volume dropped 29% owing to timber stand improvement on upland pine sites and to clearing, overcutting, and drought in bottomlands. Many stands still were not fully stocked, so timber growth was only half its potential. Greatest opportunities are in more and better stocking of pine stands, and more sound, conservative management of hardwood stands. As everywhere, good management is most needed on small holdings. The paper gives an abundance of statistics on growth, cut, existing stands, etc.

Webster, Henry H., and Carl H. Stoltenberg. THE TIMBER RESOURCES OF NEW JERSEY. US For. Serv., NE. For. Exp. Sta., Upper Darby, Pa. iii + 41 p., 10 figs. 1958.

N. J. has over 5 million people, yet more than 46% of the state is forested. Much of the forest has been cut heedlessly several times and burned repeatedly. Lumber production dropped rapidly until the late 1920s, but production in 1955 was nearly 4 times that of 1932. Partly responsible for the improvement are better fire protection and drop in cutting for fuel. Nearly 80% of the 17 million board feet cut for lumber in 1955 was hardwood. Softwoods, mainly pines, made up 75% of the 85,000 cords cut for pulp. Most of the timber is small or of low grade owing to poor cutting practices and fire. Large volumes of hardwoods are suitable for pulp; this use is small but growing. Recent timber growth in N. J. is nearly 4 times the cut, but much of the growth is in low-grade hardwoods. Better timber management is badly needed, but most of the forest is in small private holdings. This report includes tables of data on growth, cut, volumes, area, ownership, etc. It also has a generalized map of major forest types in N. J.

WILDLIFE--NEW GAME SERIES

TECHNICAL BULLETIN, ILLINOIS DEPARTMENT OF CONSERVATION, DIVISION OF GAME MANAGEMENT. Published irregularly by Ill. Dept. Cons., Springfield. No. 1, v + 137 p., 27 figs., July 1958. Single copies available on request to publisher.

New series of research reports. No. 1 is a major monograph, "Investigations of ring-necked pheasants in Illinois," by Wm. B. Robertson, Jr., and is reviewed in this issue of WR.

## WILDLIFE--BIOTAS, ECOLOGY, NATURAL HISTORY

Brown, Vinson, Charles Yocom, and Aldene Starbuck. WILDLIFE OF THE INTER-MOUNTAIN WEST. Naturegraph Co., San Martin, Calif. Vol. 4 of Am. Wildl. Region Ser. 144 p., "over 550 illustrations, 14 photos, 2 maps." 1958. $2.50, paper; $3.75, cloth.

This popular guide covers 2 regions, "the Palouse of eastern Washington, northeastern Oregon, west central Idaho and south central British Columbia; and the Great Basin plateau region between the Rocky Mountains and the Sierra Nevada..." "In the first part of this book the plants are grouped by vegetation communities. Photographs of these plant communities or habitats are shown at the beginning of each section. Following the descriptions of the plants of each habitat is a list of the common animals most likely to be met with in that habitat... In later parts of the book the mammals, birds, reptiles and amphibians most likely to be met with in these regions are illustrated and described." Some of the drawings are too small and dark, others are good. Descriptions of species are necessarily brief and simple, but should suffice for preliminary identification of many common plants and animals if properly used with drawings and the information given on habitats and ranges. Index of common and generic names and list of 24 good references of technical or semitechnical type.

Elton, Charles S. (Bur. Anim. Pop., Oxford, Eng.) THE ECOLOGY OF INVASIONS BY ANIMALS AND PLANTS. Methuen & Co., London; John Wiley & Sons, 440 4th Ave., N. Y. 16, N. Y. 1-181 p., 51 figs., 51 pl. 1958. $5.25.

Geological changes in the history of the earth produced a distribution of animals and plants that permitted the development of a wealth of species and a wide variety of balanced ecological communities. Man not only has changed the face of the earth, but also has moved animals and plants about on a large scale. The repercussions of these changes are analysed from an ecological and conservation viewpoint. The book begins with a review of effects of some spectacular invasions of recent years: the African malarial mosquito in Brazil, the chestnut blight and the starling in the U. S., and the muskrat in Eurasia. Chapter 2 is a discussion of Wallace's Realms and the natural distribution of animals. Later chapters document and analyze a variety of invasions by animals and plants, their effects on continents, their more severe effects on islands, and changes in the sea. Chapters 6 & 7 explain some of the principles and mechanisms for balance between populations, and the effects that invading species have on this balance. In the field of pest control, the effects of both biological control measures and chemical treatments are discussed. A conservation philosophy and practice is presented in the final chapters. Here the implications of the book are integrated. All of man's activities have tended to simplify ecological communities--pure stands in crop fields and managed forests, reduction in numbers of species, world-wide distribution of an increasing number of species. Members of a simplified system are subject to enormous fluctuations in numbers because of lack of the balance of diversity. Thus the troubles begin, only to be attacked by poisoning campaigns and other practices that simplify the community still further and lead to successive crises. Elton proposes a conservation of variety backed by a philosophy of practicality that recognizes the place of animals and plants in man's world.--L. F. Stickel.

Freuchen, Peter, and Finn Salomonsen. THE ARCTIC YEAR. G. P. Putnam's Sons, 210 Madison Ave., N. Y. 16, N. Y. 438 p., line drawings and maps. 1958. $5.95. [From review by E. Eisenmann, Auk 75(3).]

Although intended for general readers, and although about half the text is on Eskimos, this book is crammed with fascinating information--much of it ornithological, for Salomonsen is an expert on Greenland's birds. The introduction defines low-arctic and high-arctic regions and sketches the factors, including glaciation, that affect distribution of organisms. The rest of the book is a month-by-month account of what happens to the environment and its creatures. It includes much unfamiliar data and stimulating speculation. Under the discussion of Bergmann's rule, the authors point out that, in some areas, large arctic animals may become smaller rather than larger, owing to lack of enough food for large animals. Avian examples are mentioned. Whiteness may do more than conceal, for it is extreme where there is little snow; perhaps the pigmentless spaces in hairs and feathers help insulate. The molt migration of drake King Eiders from Canada to form an unsurpassed concentration of flightless waterfowl on w. coast of Greenland is described and mapped. Index facilitates biological use of the book. A bibliography is also provided.

Kessel, Brina. (U. Alaska, College.) PATTERNS OF BIRD AND MAMMAL DISTRIBUTION IN ALASKA. Sci. in Alaska 1953. p. 190-197. 1956.
Primarily a brief discussion of faunal origins and migration routes.

Moore, Hilary B. (Marine Lab., U. Miami, Fla.) MARINE ECOLOGY. John Wiley & Sons, 440 4th Ave., N. Y. 16, N. Y. xi + 493 p., 244 figs. 1958. $9.50.
An interesting, well-rounded introduction for students and nonspecialists. It is usefully technical and factual, but is not nearly as heavy, mathematical, and forbidding as it might easily have been made. It is, in fact, quite readable for a serious work that is suitable for use as an advanced college text. One fine feature that adds much interest to the book is that the author never loses sight of animals and plants. Even sections on chemical and physical factors consistently show the effects of these factors on organisms. This policy is followed throughout, for the book is on marine bioecology, not oceanography. Much of the more technical material is presented in charts, graphs, and tables. Publications are referred to freely and are cited in a 27 p. bibliography in which preference is given to key works in English. Names of organisms mentioned in the text are placed in systematic classification in the appendix. Chapters on physical and chemical factors discuss such matters as pressure, light, abrasion, currents, $CO_2$, pH, and organic compounds. Biological factors considered include food, crowding, dispersal, predation, and their interaction. A chapter on the sea bottom shows how organisms are affected by such widely differing floors as those afforded by estuaries, coral reefs, rocky bottoms, and mud bottoms. A series of chapters takes up the ecology of organisms of various habitats, including abyssal, inshore pelagic, sublittoral algal forest, intertidal zone, and others. A short final chapter is a review of the whole book. Fisheries students will find a great deal of interest in the book, even a discussion of evidence on the possibility of overfishing. Terrestrial ecologists and wildlife managers will find the book a fine source of background, but they will obtain little specific information on the ecology of marine birds and mammals.--P. F. Springer and W. H. Stickel.

Neal, Ernest Gordon. (Taunton School, Eng.) WOODLAND ECOLOGY. Harvard U. Press, Cambridge, Mass. 119 p., illus. 1958. $1.75. [From Harvard U. Press catalog, Fall 1958.]
"...a practical introduction to plant and animal ecology, based largely on a four year study of one woodland community. Written primarily for secondary school seniors and those attending first-year university courses, the author's synthesis of the plant and animal components of a wood should prove useful to all naturalists. Dr. Neal attempts to build up an integrated picture of the wood as a whole unit. As the plant life is the scaffolding of the wood, the flora is investigated first. The adaptations of woodland animals are considered in terms of food competition, protection, and reproduction. Finally, dispersal adaptations lead the student to the importance of numbers, the concept of balance and the dynamic nature of the community."

New Zealand Ecological Society. REPORT OF THE SIXTH ANNUAL MEETING. 1957. Proc. N. Z. Ecol. Soc. 5. 1-32. 1957. [From Biol. Abs. 32(8).]
Papers presented at this meeting include: Diminishing endemics at Chatham Islands and possible preservation, E. A. Madden; Ecology of some New Zealand seabird colonies, Mary E. Gillham; Changing incidence of parasites in a declining rabbit population, P. B. Bull; Ecology of rabbits in New Zealand compared with California rodents, Walter E. Howard; Birds of the sand country, R. A. Falla; Sambar (Cervus unicolor) in sand-hill country, Thane Riney; and The hedgehog population and invertebrate fauna of the west coast sand dunes, R. E. Brockie.

Olson, Sigurd F. LISTENING POINT. Alfred A. Knopf, 501 Madison Ave., N. Y. 22, N. Y. x + 244 p., illus. 1958. $4.50.
This group of essays pertaining to Minnesota's Quetico-Superior country is focused upon a particular point of land that epitomizes the perfect wilderness camping spot: a spot near enough to be enjoyed frequently yet remote enough to remain wild--a listening point to which one can go and through alertness of senses and mind enjoy the sounds and sights of nature. The author's continued association with this spot, combined with his long familiarity with the waters and lands of the Canadian Shield, brings forth an interesting array of experiences, all vividly described. Deftly interwoven are sketches of the North

Country from its geologic formation and glaciation to the present and the changes now in progress. The portrayal of people, plants, and animals encountered in Olsen's wilderness travels makes for pleasurable reading and heightened appreciation. The book is highlighted by black-and-white chapter-heading drawings by Francis Lee Jacques.--W. T. Van Velzen.

Pewe, Troy L. (US Geol. Surv., College, Alaska.) BRIEF REVIEW OF PLEISTOCENE EVENTS AND CLIMATIC CHANGES IN ALASKA. Sci. in Alaska 1953. p. 186-189. 1956.
Includes mention of faunal changes.

## WILDLIFE--NATURAL AREAS & REFUGES

Anon. A CITY HOME FOR WILDLIFE. Orange Disc (Gulf Oil Co.) May-June 1958, p. 22-25, 11 photos. 1958.
Philadelphia has a 205-acre wildlife marsh in its industrialized sw. corner. Tinicum marsh is now public property and is managed by a trained wildlife biologist as a refuge and living museum. Tinicum was once much larger and was famous among local ornithologists and hunters. Parts were gradually taken for other purposes and the remaining portion went through various vicissitudes. When it was threatened with obliteration by being made a dumping ground for dredged silt, conservationists waged a campaign for preservation. The Gulf Oil Co. donated 145 acres it owned as part of a tank farm and the federal government donated 60 adjacent acres. Now 150 kinds of plants and 230 kinds of birds may be seen by naturalists and groups of school children. Ducks of several species breed at Tinicum and thousands of ducks, especially pintails, use the marsh in the fall and winter. There are many muskrats and turtles, and mink are to be restored. One observation platform has been built at the edge of the marsh and others are planned.

Anon. PUBLIC USE OF NATIONAL WILDLIFE REFUGES - 1957. US F&WS, Wildl. Leafl. 396. 4 p. Apr. 1958.
A tabulation of the use of each refuge for hunting, fishing, and other purposes. In terms of visitor-days, "more than 8-2/3 million persons were on these areas. These 8,668,580 visitors represent a 14.6 percent increase over 1956, when 7,555,334 visitors were present. Almost a third, or 2,908,435, used the refuges for fishing. Public hunting amounted to 4-1/2 percent, or 388,995 visitor-days. Wildlife observations, picnicking, and swimming, together with business and official use, amounted to 5,371,150, or more than 62 percent of all uses."

Paine, Barbara B. CHALLENGE TO SUBURBIA. Nat. Mag. 51(8): 428-431, 6 figs. Oct. 1958.
"Any natural land is worth saving, especially in the suburbs." Cities and highways are engulfing the landscape and leaving few open areas of any sort, much less natural habitats. With a little delay in acquisition, the price of desired land skyrockets to an impossible level. But devoted local groups that work cannily and carefully can achieve real results. This article tells how a few people at Wayland, Mass., have organized the "Sudbury Valley Trustees" and how they have saved, as a beginning, 400 acres of marsh and woods.

Seaton, Fred A. (US Dept. Int.) AMERICA'S LARGEST WILDLIFE AREA. Natl. Parks Mag. 32(134): 117-122, 144, 6 figs. July-Sept. 1958.
Describes the proposed 9 million-acre Arctic Wildlife Range in Alaska and discusses its wildlife and scenic values. Also tells what limitations would be placed on commercial developments in the Range. Canada may set aside an adjacent area of 5 million acres.

Shanklin, John F., committee chairman. (US Dept. Int., Wash. 25, D. C.) CRITERIA FOR MANAGEMENT OF NATURAL AREAS. J. For. 56(9): 702, 704. Sept. 1958.

WILDLIFE--NATURE PROTECTION & RARE & EXTINCT SPECIES

Breckenridge, W. J. (Mus. Nat. Hist., U. Minn., Minneapolis.) A NEW THREAT TO WILDLIFE. Flicker 30(2): 60-61. June 1958.

The mallards kept in open pens at shooting preserves are an irresistible magnet for all the hawks and owls in the vicinity. Slaughter of raptores at the pens is entirely legal. Operators should be required to keep their birds in enclosed pens. Fish-rearing ponds offer a comparable hazard to fish-eating birds. "Not only do predatory forms serve a balancing function on noxious animals, but today a fast-growing public awareness of the recreational value of birds and wildlife of all kinds, places just as much value on a colorful Red-tailed Hawk or a rare Long-eared Owl as on a pheasant or a duck."

de La Tour, Georges Dennler, editor. NATURE PROTECTION THROUGHOUT THE WORLD. Buenos Aires. 545 p., illus. 1957. $9.00, paper, $10.00, cloth, from editor, Pasaje Seaver 1656, Buenos Aires, Argentina.

Issued under the auspices of the International Union for the Protection of Nature, this volume is dedicated to the memory of Dr. Hugo Salomon, pioneer of nature protection in S. Am. and other parts of the world. The book is well printed on good paper and well illustrated with photographs, drawings, and maps. Papers are in English, French, Spanish, or German and are by many authors. After 9 brief introductory papers, there are 5 papers on India and Indonesia, 4 on New Zealand, 8 on Africa, 2 on Europe, 7 on S. Am., 2 on U. S. national parks, 1 on U. S. national refuges, and 1 on Canadian national parks. The book does not attempt a complete survey of the world's nature reserves and preservation problems, but gives much information on both. As some indication of the contents of the book, we list the titles that deal with S. Am.: Defensa de la Fauna en Chile, by C. A. Finsterbusch. Quelques aspects du problème de la Protection de la Nature au Pérou, by Jehan Vellard. The National Parks of Argentina, Their Aim, and Some Truths Concerning Their Present Condition, by G. D. de La Tour. L'ichtyofaune d'eau douce dans le plan du conservationnisme argentin, by Gaston Huysmans. Parques Nacionales y Reservas Naturales Argentinos, by G. D. de La Tour. Parques Nacionales y Reservas Forestales de Chile, by G. D. de La Tour. The Endemic South American Species of the Genus Nicotiana, by T. H. Goodspeed.--F. C. Lincoln and W. H. Stickel.

McClure, H. Elliott. (Inst. Med. Res., Kuala Lumpur, Malaya.) WILDLIFE CONSERVATION PROBLEMS IN SOUTHEAST ASIA, A REPORT ON THE NINTH PACIFIC SCIENCE CONGRESS. J. Wildl. Mgt. 22(3): 315-316. July 1958.

This brief review of a few of the 800 papers presented at the Congress points out that there is little wildlife conservation in many countries of the region--and none in some. What regulations there are have scant public support. Several of the larger animals are in dangerous positions. For example, the Borneo Rhinoceros is down to about 25 individuals and Orangutans are extirpated from wide areas. The Congress made a number of valuable recommendations; the 10 that pertain to conservation and wildlife are presented in this paper. Action on these recommendations would mean much more conservation of endangered species, many more parks and forests in all countries of the region, conservation education in the schools, and creation of a regional conference of conservation biologists.

WILDLIFE--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Harker, Janet E. (Cambridge U., Eng.) DIURNAL RHYTHMS IN THE ANIMAL KINGDOM. Biol. Revs. Camb. Philos. Soc. 33(1): 1-52. Feb. 1958.

Long, valuable review paper that considers rhythms, and what is known of factors that control them, in all groups of animals. About 360 references are cited.

Irving, Laurence, and John Krog. (Arctic Health Res. Center, Anchorage, Alaska.) SKIN TEMPERATURES AND THE CONSERVATION OF HEAT. Sci. in Alaska 1954. p. 34. 1957.

Abstract only.

Smith, Audrey U. (Natl. Inst. Med. Res., Mill Hill, London, Eng.) THE RESISTANCE OF ANIMALS TO COOLING AND FREEZING. Biol. Rev. of Cambridge Philos. Soc. 33(2): 197-253, 4 figs. May 1958.

Important review paper with 14 p. of references. Major sections discuss: The viability of poikilothermic animals after freezing and thawing. Effects of low environmental temperatures on homeothermic animals. Artificial hypothermia in mammals. Resuscitation of hypothermic mammals...

Thacker, E. T., and K. C. Beeson. OCCURRENCE OF MINERAL DEFICIENCIES AND TOXICITIES IN ANIMALS IN THE UNITED STATES AND PROBLEMS OF THEIR DETECTION. Soil Sci. 85(2): 87-95. 1958. [From J. Range Mgt. 11(4).]

## WILDLIFE--EFFECTS OF CHEMICALS, WEATHER, CARS, ETC.

Anon. COURT UPHOLDS DDT SPRAYING. Am. For. 64(8): 23, 55-56, 1 photo. Aug. 1958.

A federal judge in Brooklyn upheld the right of the state and federal governments to spray DDT aerially for control of gypsy moth without permission of landowners. The judge held that the plaintiffs had not adequately demonstrated that they had suffered damage. No positive evidence was presented of any long term or permanent damage resulting from the spraying. Medical witnesses for the plaintiffs contended that DDT is responsible for a wide variety of human ailments, but as these claims could not be proved, they may have weakened the case. The plaintiffs plan to appeal. [The defense won the case, but it is understood that spraying for gypsy moth eradication has been postponed or reduced in certain ne. states as a result of the furor.]

Barker, Roy J. (Ent. Res. Div., Beltsville, Md.) NOTES ON SOME ECOLOGICAL EFFECTS OF DDT SPRAYED ON ELMS. J. Wildl. Mgt. 22(3): 269-274, 1 fig. July 1958.

Moderate applications of DDT under certain conditions possibly can be concentrated by earthworms to produce a lethal effect on Robins nearly one year later. The spring after elm trees on 430 acres at Urbana, Ill., were sprayed with 6% DDT, 21 dying Robins were found. Analyses of DDT in leaves, soil, earthworms, and Robins suggested that fewer than 100 earthworms can accumulate 3 mg. of DDT. This was approximately the median concentration found in dying robins.--Author.

Cutler, M. Rupert. (Va. Comm. Game.) PESTICIDES VS. WILDLIFE. Va. Wildl. 19(9): 4-5, 2 photos. Sept. 1958.

Short general discussion of fire-ant and other control programs in relation to wildlife. It points out that some of the trouble comes from overtreatment and mistakes of application. "Human error can never be eliminated. Some degree of coordination can be effected, however. Connecticut has proven that. Permits for aerial spraying are issued by the nutmeg state's aeronautics director, and policies and regulations concerning the application of pesticides are made by a committee consisting of the aeronautics director, the fish and game director, the agricultural experiment station director and the commissioner of health. All large-scale spraying operations are reported beforehand to the aeronautics director to eliminate most duplication and the resultant over-dosage problems."

DeWitt, James B. (Patuxent Refuge, Laurel, Md.) BIRDS AND DUTCH ELM DISEASE CONTROL. Proc. 13th Midwestern Shade Tree Conf.: 3-7, mimeo. Feb. 1958.

Brief, factual review of information on effect of DDT and other insecticides on birds. One program for control of elm disease caused 22% decrease in number of adult birds and 56% mortality of nestlings. Quail fed 3 oz. of DDT per ton of food had 16% reduction in young hatched and 500% increase in defective chicks. Quail fed same dosage during winter and breeding seasons had 30% decrease in fertile eggs and 800% increase in defective chicks. More than 90% of their chicks died in first 6 weeks although fed no insecticide. Almost equally bad results came from feeding Pheasants diets with about 1 oz. DDT per ton. Other common insecticides (chlorinated hydrocarbons) also caused lowered chick survival and higher percentages of crippled chicks. From field data we know that 2 lbs. DDT/acre can affect birds and has even worse effects on cold-blooded animals. Efforts to control elm disease have left as much as 196 lbs. DDT/acre in top 3

inches of soil. Earthworms concentrate DDT in their tissues. Thus the treated areas can be traps for birds and other animals. What can be done? 1) In control of elm disease, use minimum effective amount of insecticide; mist blowers use less than sprayers. 2) Avoid applications during migration and nesting seasons. It has been reported that adequate control can be obtained with dormant sprays and that foliar applications may not be required. Tables of this paper show effects of DDT on reproduction of Quail, relative toxicity to Quail of 8 insecticides, and amounts of 7 insecticides required to cause 40% or more decrease in Quail reproduction. These comparisons demonstrate that Aldrin, Endrin, and Dieldrin are 20 to 200 times as toxic as DDT and that Heptachlor and Chlordane are only slightly less toxic than Dieldrin. Methoxychlor and Strobane are less toxic to Quail than is DDT.

Gagnon, André. (U. Laval, Quebec, P.Q.) LA TOXICITÉ DU DDT POUR LE SAUMON DE L'ATLANTIQUE (SALMO SALAR LINNÉ) ET LES ALEVINS DE TRUITE (SALVELINUS FONTINALIS MITCHILL). Can. J. Zool. 36(4): 479-487, 3 figs. Aug. 1958.

Sensitivity of young salmon and trout to DDT was tested in hatchery troughs. Mortality was 93-100% with dosage rate of 0.5 lb./acre (0.32 p.p.m.) and part-time circulation of water. Sensitivity of salmon decreased with age. DDT was also tested in still-water troughs at rates of from 0.05 to 0.5 lb./acre (0.036 to 0.33 p.p.m.). The av. lethal dose was 0.072 p.p.m. Experiments demonstrated how mixing of DDT with water makes the poison more deadly than when used in oil surface film.

Hoffman, Luc. (Sta. Biol. Tour du Valat, Bouches-du-Rhone, France.) EFFECTS OF THE COLD WAVE OF FEBRUARY 1956 ON THE VERTEBRATES OF CAMARGUE, RHONE DELTA. Terre et Vie 104(2/3): 186-197. 1957. [From Biol. Abs. 32(7).]

In French. Populations of certain reptiles were reduced after the cold spell. Many flamingos, waterfowl, rails and insectivorous passerines starved due to freezing of water and soil in their feeding areas, and due to high winds preventing feeding. Analysis of banding recoveries indicated 52% to 74% of the European teal (Anas crecca) population disappeared. Many weakened birds were slaughtered by hunters.--R. M. Chew.

Ide, F. P. (U. Toronto, Ont.) EFFECT OF FOREST SPRAYING WITH DDT ON AQUATIC INSECTS OF SALMON STREAMS. Trans. Am. Fish. Soc. 86: 208-219, illus. (1956) 1957. [From Biol. Abs. 32(8).]

The number and volume of aquatic insects emerging from tributaries of the Miramichi R. of n. New Brunswick, where forest-covered watersheds had been sprayed from the air (0.5 lbs. per acre), are compared with unsprayed streams. Yard-square cage-traps were used to capture adults. In streams affected by DDT, far fewer insect species, especially larger forms like caddisflies, occurred. In general, sprayed streams had larger numbers than unsprayed, but in all sprayed streams the volume was significantly lower because of scarcity of large species. The insect fauna of sprayed streams was deficient in the kinds of insects on which salmon fed.--From auth. abst.

Lay, Dan. (Texas Game Comm., Buna.) COUNT THREE FOR TROUBLE. Texas Game & Fish 16(7): 4-7, 5 photos. July 1958.

Research report on effect of fire-ant extermination on wildlife in Hardin Co., Texas in spring of 1958. Summary: "On the Fralise Ranch, where heptachlor was applied at the rate of two pounds per acre, it was found that: 1. Bird populations along ranch roads in the treated areas were reduced 92 to 97 per cent in two weeks. 2. Bird populations within acre-plots studied were reduced 85 per cent in two weeks. 3. Nesting success of birds in the area was reduced 89 per cent. 4. Almost all wildlife species present--including birds, mammals, fish, reptiles, amphibians, insects, and crustaceans--were affected. 5. Heptachlor proved to be lethal to wildlife when applied to either wet or dry soil." The chemical or its epoxide was found in tissues of dead animals at rates of 2.6 to 19.9 micrograms per gram, dry weight. Game and fur animals were among those killed. Aquatic animals were seriously depleted although efforts were made to avoid treating water areas.

Peet, Creighton. ARE WE SLOWLY COMMITTING SUICIDE? Am. For. 64(5): 16-17, 47-49, 2 figs. May 1958.

Essentially a summary of "The Pesticide Problem," by John L. George (see WR 92: 17). Peet reviews facts and figures on effects of DDT on fish and wildlife, discusses new insecticides briefly, and reports some of George's suggestions for large-scale study of pesticide problems.

Tarzwell, Clarence M., and Crosswell Henderson. (San. Eng. Ctr., U. S. Pub. Health Serv., Cincinnati, Ohio.) TOXICITY OF DIELDRIN TO FISH. Trans. Am. Fish. Soc. 86: 245-257, illus. (1956) 1957. [From Biol. Abs. 32(8).]

Toxicity bio-assays of run-off water from land treated with dieldrin (4.66 lbs. per acre) indicated that run-off from the first rain following treatment was toxic to the fathead minnow, Pimephales promelas, at a dilution of 1 in 3. Mortality in run-off after 3d rain was less than 50%; after 4th rain only a few fish were affected. A time-of-effect concentration curve was prepared by exposing fish to known concentrations of dieldrin. Tests with samples of unknown concentration indicated that dieldrin concentration could be estimated within 25% in the range of 0.03 to 0.5 ppm. By using this curve the composite sample of run-off was estimated to contain 0.128 ppm dieldrin. Dieldrin was also toxic to bluegill sunfish and green sunfish. The 96-hour TL/m values ranged from 0.0056 to 0.042 ppm depending on formulation and kind of fish. Dieldrin was more toxic in hard than in soft waters. Little toxicity loss was indicated through hydrolysis, precipitation or chemical reaction.--From auth. abst.

## WILDLIFE--POPULATIONS & FLUCTUATIONS

Solomon, M. E., and G. C. Varley. (Pest Infestation Lab., Slough, Eng.) MEANING OF DENSITY-DEPENDENCE AND RELATED TERMS IN POPULATION DYNAMICS. Nature 181(4626): 1778-1781. June 28, 1958.

Wing, Leonard W. (3875 Vorhies Rd., Ann Arbor, Mich.) LATITUDINAL PASSAGE BEHAVIOR. J. Cycle Res. 7(3): 67-78, 3 figs. July 1958.

From summary: Newer techniques of analysis have been applied to study of solar-terrestrial cycle relationships. Wave lengths tested are of 668, 198, 22.71, 11.08, 9.93, 9.60, 9.27, 4.418, 4.222, 3.862, and 3.767 years and 5.115 days. There are 121 epochs determined in 54 terrestrial phenomena for these twelve cycles. The passage on earth appears to be from Pole to Equator, though data are available only to 78° North and 60° South. The rate of passage appears to be the same for all cycles, 70.71% of the wave length. Latitudinal passage appears to be a universal behavior of all cycles so far tested, solar and terrestrial. It seems to indicate a law that epochs pass latitudinally and simultaneously over the respective solar and terrestrial spheres, as if a 'ripple' passed. Many of the tabular data given on p. 76-78 pertain to biological examples.

## WILDLIFE--BIOMETRICS

Bliss, C. I. PERIODIC REGRESSION IN BIOLOGY AND CLIMATOLOGY. Conn. Agr. Exp. Sta. (New Haven, Conn.), Bul. 615. 55 p. June 1958.

Should be of interest to biologists interested in describing periodic phenomena by mathematical functions and in conducting tests of significance of estimates of parameters of the fitted line. Although a fair background in mathematics is required for complete comprehension of the procedure, many wildlife biologists should be able to apply some of the routine procedures with little difficulty. In the author's words, "Periodic regression is applied here to cyclic phenomena in biology and climatology in which (1) the length of the cycle, such as a year or day, is determined independently of the response, (2) the observations are spaced evenly through the cycle, and (3) the number of replicates is constant at each interval... A distinction is drawn between two objectives in periodic analysis, that of locating sources of variation and describing their characteristics, and forecasting..."--V. Schultz.

Bliss, C. I., and A. R. G. Owen. (Conn. Agr. Exp. Sta., New Haven.) NEGATIVE BINOMIAL DISTRIBUTIONS WITH A COMMON k. Biometrika 45(1/2): 37-58. June 1958.
"The most widely applicable of the over-dispersed distributions, the negative binomial, is defined by the arithmetic mean and a parameter k. Comparisons between the means of two or more distributions are more direct and unequivocal if they have the same relative dispersion in terms of k. Two approaches to a common k are described and illustrated with numerical examples."--V. Schultz.

Brass, W. (U. Aberdeen, Scot.) SIMPLIFIED METHODS OF FITTING THE TRUNCATED NEGATIVE BINOMIAL DISTRIBUTION. Biometrika 45(1/2): 59-68. June 1958.--V. Schultz.

Grenander, Ulf. MODERN TRENDS IN TIME SERIES ANALYSIS. Sankhyā 18(1/2): 149-158. May 1957.
Presents a summation in the present situation in this field.--V. Schultz.

Leslie, P. H. (Bur. Animal Population, Oxford U., Eng.) A STOCHASTIC MODEL FOR STUDYING THE PROPERTIES OF CERTAIN BIOLOGICAL SYSTEMS BY NUMERICAL METHODS. Biometrika 45(1/2): 16-31. June 1958.
"It is developed here for the case of a single species living alone in a limited environment, namely, a logistic process; for a system of two competing species; and also for the predator-prey type of interaction."--V. Schultz.

Parker, Robert R. (Alaska Dept. Fisheries, Juneau.) TWO PROPOSED METHODS OF ESTIMATING ANIMAL POPULATION. Sci. in Alaska 1954. p. 39. 1957.
Abstract only. "The author presents alternative methods of estimating animal populations from tagging programs. In the past these have frequently been based upon invalid assumptions. The methods used here apply only to those cases where a population sustains a selective mortality. The first technique deals with cases in which exploitation is limited to certain size groups within a population. Gill net fisheries are examples of this type of exploitation. A hypothetical example is made from it. This method enables a researcher to estimate the population as well as the size groups comprising it. The second technique is limited to selective removal and is applied to a case where a population of deer is subjected to a buck hunt. The result of this technique is a pair of simultaneous linear equations whose solution gives an estimate of the population."

Schultz, Vincent, and Samuel H. Brooks. (U. Md., College Park.) SOME STATISTICAL ASPECTS OF THE RELATIONSHIP OF QUAIL DENSITY TO FARM COMPOSITION. J. Wildl. Mgt. 22(3): 283-291, 1 fig. July 1958.
The relationship of Bobwhite population levels to farm composition in 3 Tenn. farming-types was studied by means of a multiple-regression model. The paper is primarily concerned with problems encountered in sampling and analysis and secondarily with biological conclusions. Area sampling was utilized to collect data on number of coveys per farm. In addition, the total acreage in cropland, pasture, and woodland was obtained for each farm. It is shown that the 3 variates are correlated. This limits results of multiple-regression analysis to relative comparisons of "effects" of the variates on quail density. The paper stresses difficulties encountered in interpreting results of a multiple-regression analysis, and in separating effects of factors that are themselves correlated. The role of pasture, woodland, and cropland in establishment of quail population density did not appear to be constant between farming-types.--V. Schultz.

Skellam, J. G. (Nature Conservancy, London, Eng.) ON THE DERIVATION AND APPLICABILITY OF NEYMAN'S TYPE A DISTRIBUTION. Biometrika 45(1/2): 32-36. June 1958.
"It would appear that the sampling situation to which Neyman type A is particularly suited is one when the organisms occur in compact clusters... Nevertheless, the type A distribution exhibits considerable robustness, and can be employed as an approximation in certain circumstances where the condition requiring compact clustering can be greatly relaxed."--V. Schultz.

Skellam, J. G. (Nature Conservancy, 19 Belgrave Sq., London, S.W.1, Eng.) THE MATHEMATICAL FOUNDATIONS UNDERLYING THE USE OF LINE TRANSECTS IN ANIMAL ECOLOGY. Biometrics 14(3): 385-400. Sept. 1958.

An article of interest to mathematical or non-mathematical readers. The paper mainly treats mathematical aspects of line transects, but the introduction and historical sections offer much to the non-mathematician. Emphasis is placed on the need for life-history data prior to establishment of transects. Results obtained must be scrutinized carefully on the basis of biological information. The author is concerned primarily with Yapp's 1st and 2d formulae.--V. Schultz.

Whittle, P. (Applied Math. Lab., D.S.I.R., Wellington, N. Z.) ON THE USE OF THE NORMAL APPROXIMATION IN THE TREATMENT OF STOCHASTIC PROCESSES. J. Roy. Stat. Soc., Ser. B, 19(2): 268-281. 1957.

"A method of treating nonlinear Markov processes is discussed, based on the assumption that the variates are normally distributed. The method is applied to models of logistic population growth, plant competition, and animal predation ..."--V. Schultz.

## WILDLIFE--TECHNIQUES

Anon. FLYING SYRINGE. J. Am. Vet. Med. Assn. 133(6), adv. p. 42, 2 figs. Sept. 15, 1958.

Photo and diagram of a new syringe-dart used to capture large animals unharmed, or to tranquilize them for handling. "The device is a flying syringe which, when fired from a special gun, injects nicotine into the body of the animal as soon as it strikes home. This stuns the animal for up to 30 minutes without harmful after-effects, according to the company. Valuable to game wardens and to hunters of zoological specimens, it can also be used to halt riots. The propulsive force for injecting the nicotine is carbon dioxide gas, formed when a tablet dissolves in water as the gun is fired. The syringes vary in length from 2 to 6 inches, depending on the size of the animal. The needle, which is painless to animals, is made from 13-gauge needle tubing..." Manufacturer is Palmer Chem. & Equipment Co., Atlanta, Ga. [Other firms may produce comparable devices, but we have no data on this point.]

English, P. F. (Pa. State U., U. Park.) A METHOD OF ATTACHING SKIN AND SKULL SPECIMENS. J. Mamm. 39(3): 456, 1 photo. Aug. 1958.

"The method used was to clean the skull as usual, give it the same number as on the skin label and then roll it in a piece of cellophane, making it like a tube. Next one end was folded and bent back over a strong thread. This was then stapled with an ordinary stapling machine. The other end was folded back and held in position with a paper clip. The skull was then tied to the right hind leg where the label was also placed..." Skull can be studied through the tube or easily removed for detailed observation. System has worked well for years under class use.

Gatty, Harold. NATURE IS YOUR GUIDE. E. P. Dutton, 300 4th Ave., N. Y. 16, N. Y. 287 p., illus. 1958. $4.95. [From review by J. V. K. Wagar, J. For. 56(10).]

"The book is an excellent primer for increasing numbers of people who travel to all parts of the world." The author is a trained navigator and traveler, but "he revels in the literature, folk-lore, and natural phenomena which everywhere show...clues to man's predictable comings and goings." "This tidy volume (7/8 x 5-3/4 x 8-1/4 inches) is packed with a detailed index, sun tables, a bibliography, unusual colored illustrations, star charts, a foreword by General Doolittle, and 25 chapters. These include: How Early Man Found His Way . . . A Sixth Sense (of direction) . . . Walking in Circles . . . in a Straight Line . . . Use of the Ears . . . Smell . . . Reflections in the Sky . . . Directions from the Wind . . . Trees and Other Plants . . . Anthill Signposts . . . Finding Your Way in the Desert . . . In Polar Regions . . . Directions from Hills and Rivers . . . from Waves and Swells . . . the Color of the Sea . . . Habits of Sea Birds . . . the Moon . . . The Sun . . . the Stars . . . Telling Time by the Stars."

WILDLIFE--TECHNIQUES--Continued

Overton, Scott, and John Sincock. (Fla. Game Comm.) SOME USES OF MARK SENSING IN COLLECTING GAME MANAGEMENT DATA IN THE FIELD. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 131-134. 1956 (1957).

From summary: "Mark sensing is a very versatile recording technique that has a high potential of application in wildlife work. Card holders are available that are very practical for field use, and much routine collection of data can be greatly facilitated by the use of this system. Bag checks, creel census, call counts, quadrat studies--all collection that is done on a large scale by standardized procedures--can be set up on a mark sense system." The procedure has facilitated both collection and processing of data. Mark sense cards are a type of IBM cards on which one marks with a special high-graphite (electrographic) pencil. These marks make possible automatic punching of cards that can be handled by machine in a great many ways with great speed. The system is well worth consideration by anyone who has access to suitable machines.

Sanford, F. Bruce. PLANNING YOUR RESEARCH PAPER. US F&WS, Fishery Leafl. no. 447. 32 p., 14 figs. Apr. 1958.

A practical aid that includes both general and specific suggestions. Proper use of outline, tables, graphs, headings, paragraphs, discussion, conclusions and summary are discussed and illustrated. Suggestions to improve organization and clarity begin with an analysis of the planning of the research and continue through a discussion of methods of presenting data; they show how to get ready to write. The bibliography includes several references to books that discuss methods and techniques for actual writing.—L. F. Stickel.

Thompson, Donald R. (Wis. Cons. Dept.) FIELD TECHNIQUES FOR SEXING AND AGING GAME ANIMALS. Wis. Cons. Dept., Spec. Wildl. Rep. no. 1. 1-44 p., 25 figs. 1958.

Useful pocket-size handbook that all wildlife biologists will want to have available. It provides illustrated data for all Wis. game birds and for Whitetail Deer, Cottontail, squirrels, Raccoon, Muskrat, Beaver, and Otter. It also indicates reliability of characters described. Although not limited to external features, it is limited to features that can be examined in the field or in fur houses. Workers are expected to have some training in the techniques before relying on this handbook. Twenty-three selected references are cited.

WILDLIFE--MANAGEMENT & RESEARCH, GENERAL

Cottam, Clarence. (Welder Wildl. Found., Sinton, Texas.) SOME WILDLIFE RESEARCH PROBLEMS OF THE SOUTHEAST. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 6-11. 1956 (1957).

Research is vital to industry and appropriately large sums are spent on it. Our wildlife has a capital value of some $50 billion, yet research for its management is proportionately small. We have the benefit of many good specific research projects, but we need much more knowledge of several general fields: 1. How to integrate effective wildlife management with profitable agriculture, forestry, and grazing. 2. Basic knowledge of ecological relationships of entire biological communities. 3. How to correlate effectively commercial use of water resources with management of fish and game. 4. Effects of pesticides on fish and wildlife. 5. Determination of wisest use and management of wetlands. 6. Measurement of effects of all laws and regulations that pertain to harvest of fish and game. 7. Appraisal of soundness and effectiveness of state programs. 8. How to control bird and rodent depredation on reseeded forest and range land without too much killing of animals. 9. Study of wildlife nutrition, disease, and population fluctuations. 10. Determination of need and economy of introducing exotics. Each of these research needs is discussed.

Davison, Verne E. (Soil Cons. Serv., Auburn, Ala.) SMALL WATERSHEDS. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 21-24. 1956 (1957).

How the small watershed program operates, and what can be done under it for fish and wildlife. "Some wildlife benefits will be incidental. The most dependable fish and wildlife improvements will be planned, established, and maintained by the landowners with whatever encouragement and help they can get from individuals and agencies who have financial facilities in addition to Federal flood prevention funds. To obtain real management of privately owned lands and waters for wildlife and fish, our philosophy and practice must recognize agricultural economy--costs and incomes. This road to wildlife abundance is gradually becoming passable."

Gabrielson, Ira N. (Wildl. Mgt. Inst., Wire Bldg., Wash. 5, D. C.) SOUND WILDLIFE ADMINISTRATION. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 2-6. 1956 (1957).

Speaking from unrivaled experience, Gabrielson tells what top-level policies and organization are needed for a state game commission to operate properly. Good and bad examples are described.

Kubota, Joe, and Gustav A. Swanson. (US Soil Cons. Serv., Ithaca, N. Y.) WILDLIFE AND SOILS IN NEW YORK. N. Y. State Cons. 13(1): 16-18, 4 maps. Aug.-Sept. 1958.

Explains and maps major soil types of N. Y. and gives examples, from other areas, of dependence of game animals on soil fertility and availability of needed trace elements. Also shows how abundance of Pheasants in N. Y. is correlated with soil fertility and production of grains.

Peterle, Tony J. (Mich. Dept. Cons., Lansing.) GAME MANAGEMENT IN SCOTLAND. J. Wildl. Mgt. 22(3): 221-231, 7 photos. July 1958.

Good discussion of present practices, problems, and trends. Game is at the disposal of the landowner. As estates are broken up, more land is being controlled for hunting by cooperatives. Keepers are hired to rear birds, control predators, conduct drives for shoots, and do some habitat management. Eggs of selected wild Pheasants are hatched under domestic hens. Most of the resulting birds are shot off in carefully planned drives. Many species are bagged on these drives; much of the game is sold. Hand-rearing of Partridges (Perdix) is becoming more practicable and commoner. Control of predators is intensive and involves many species. Management of Red Grouse (Lagopus scoticus) is essentially heather management. Effort is made to burn the moors, in scattered strips, every 3-7 years. This management of grouse is compatible with sheep production. Blackgame (Lyrurus tetrix) and Capercaillie (Tetrao urogallus) usually are shot incidentally to Red Grouse. Number of birds to be shot is determined by landowner on advice of keeper. Reforestation is eliminating some grouse moors and will take more. Red Deer population levels are determined by local committees representing different interests. Red deer occur at density of 18 per sq. mi. on 3 million acres; recommended density is 10-11. Roe Deer are increasing with reforestation and damaging the plantings. Full-time keepers are paid to keep them down. "The future of game management in Scotland seems secure, principally because it is a source of income to many landowners... Groups of sportsmen, who form Game Protection Societies and purchase shooting rights from small landowners, will probably become more widespread."

Petrides, George A. (Mich. State U., E. Lansing.) UGANDA'S PRICELESS HERITAGE. Uganda Wild Life & Sport (Dept. Info., P. O. Box 142, Kampala) 1(3). 4 unnumbered p. in reprint. 1958.

Many people believe that the salvation of game lies in prevention of hunting and establishment of game reserves and national parks. These ideas can be true or false, whether in E. Africa or anywhere else. Prevention of hunting will save game only if hunting is the limiting factor; often environmental factors (land use, soil, nutrition, cover, etc.) are limiting; if they are, complete protection is sometimes actually harmful. Game reserves often are heavily used by man and livestock, and environmental factors limit game animals. If reserves have thriving game populations, there is no biological reason to avoid controlled harvests. National parks are usually closed to shooting. It is, however, important to retain their scenic and vegetational values; overpopulations of game can destroy these values and cause starvation, soil erosion, and desertine conditions. The only answer is that each situation must be handled with understanding of the factors at work. Proper management may require more protection, less protection (herd control), reduction of overgrazing by livestock, control of disease or predators, water supply, etc.

Sumner, Lowell. (Three Rivers, Calif.) THE CRITICAL IMPORTANCE OF ALASKAN WILD LAND ECOLOGY. Sci. in Alaska 1954. p. 40. 1957.

Abstract only. Discusses need of sound ecological research on game animals as basis of management, and points out that ne. Alaska would be ideal for such studies. As an example of the need, Sumner refers to caribou, which have declined over much of Alaska. Some workers believe that predation by wolves and

overhunting by man are responsible. Others believe that range damage by fire and reindeer is responsible, and that curtailment of hunting and wolf predation will simply make things worse. North of the Arctic Circle, where fires, reindeer grazing, hunting, and predation have remained light or normal, caribou populations have held up.

Titus, Harold. MORE HUNTING FOR EVERYONE. Field & Stream 63(4): 47, 107-109. Aug. 1958.

Popular article, with plenty of examples from wildlife research, designed to show hunters that upland game cannot be stockpiled, and that the longer seasons or higher bag limits proposed by technicians will help hunting and will not lower future game populations.

Webb, James W., editor. PROCEEDINGS OF THE TENTH ANNUAL CONFERENCE, SOUTHEASTERN ASSOCIATION OF GAME AND FISH COMMISSIONERS, OCTOBER 7-10, 1956, LITTLE ROCK, ARKANSAS. Printed at Columbia, S. C., by SE. Assn. Game & Fish Comms. v + 290 p., figs. 1957. $2.00 from J. W. Webb, Box 360, Columbia, S. C.

A well-printed volume of 9 x 6 in. Each page carries much information, for margins are narrow and print is relatively small. Twenty-one of the component papers are treated individually in this issue of WR. The volume also has many fisheries papers, several on education, 3 on enforcement, and several on water-use problems. Four panel discussions are summarized briefly.

Webb, James W., editor. PROCEEDINGS OF THE ELEVENTH ANNUAL CONFERENCE, SOUTHEASTERN ASSOCIATION OF GAME AND FISH COMMISSIONERS, OCTOBER 20-23, 1957. Printed at Columbia, S. C., by SE. Assn. Game & Fish Comms. vi + 393 p., illus. 1958. $2.00 from J. W. Webb, Sec.-Treas., Box 360, Columbia, S. C.

A thick, well-printed volume of 6 x 9 inches that should be in every good library of fisheries or wildlife literature. It contains 84 papers, 19 of them from technical game sessions, 34 from technical fisheries sessions, 23 from law enforcement sessions, 4 from information and education sessions, and 4 of a general type. Technical wildlife papers that were not previously covered in WR 90 and 91 from mimeographed copies are entered in this issue of WR.

## WILDLIFE--HUNTING AREAS & PROBLEMS

Dickey, Charley. (RD 2, Greenwood, S. C.) SHOOTING PRESERVES IN THE SOUTH. Proc. 11th Ann. Conf. SE. Assn. Game & Fish Comms.: 34-38. 1957 (1958).

Dickey tells what regulations are proper for shooting preserves, what the operators of preserves are up against, and what state game departments should do about licences and about providing guidance for and information on preserves. Shooting preserves are essentially one-man, low-income propositions and need a favorable regulatory climate for success. Regulations should be fair, but should be designed to keep out submarginal operators. The paper describes suitable requirements.

Dickey, Charley. (Rt. 2, Box 408, Greenwood, S. C.) FLIGHTING MALLARDS ON SHOOTING PRESERVES. Sportsmen's Service Bureau, 250 E. 43d St., N. Y. 17, N. Y. 1-27 p., illus. 1958. Free on request to publisher.

This pamphlet brings together in handy form the 3 articles by Dickey published in the Feb., April and June 1958 issues of Modern Game Breeding. These articles were abstracted in WR 91, p. 23 and WR 92, p. 22. They should serve as an excellent guide to establishment and operation of duck-shooting preserves of the flight-tower type, for they discuss an enormous number of the problems and policies involved.

Wood, Roy. (US F&WS, Peachtree-7th Bldg., Atlanta 4, Ga.) AN EXPERIMENT IN REGULATED PHEASANT HUNTING, ALLATOONA RESERVOIR PROJECT, GEORGIA. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 190-197, 2 maps. 1956 (1957).

From abstract: 100 Ringnecks were released in 7 groups on a 120-acre peninsula, Nov. 24-27, 1955. Hunting began 30 min. after first release. In all, 25 hunters, in parties of 3-7, exerted hunting pressure of 33 man-days over a 4-day period. Eighty pheasants were bagged, or about 2.4 per man-day, at cost of $3.30 per bird, exclusive of costs of ammunition, dogs, transportation and equipment. The fact that the hunting peninsula was flanked by broad areas of open

water unquestionably increased the percentage of recovery. Hunting conditions were natural, dog work was excellent, shooting was reasonably sporty, success was satisfactory, and costs were within reach of an av. hunter. The feasibility of such hunts being staged by groups of hunters was demonstrated.

## WILDLIFE--INTRODUCTIONS

Bump, Gardiner. (US F&WS, Wash., D. C.) FOREIGN GAME INTRODUCTIONS INTO THE SOUTHEAST. Proc. 11th Ann. Conf. SE. Assn. Game & Fish Comms.: 17-20. 1957 (1958).

A discussion of why, when, and where introductions are desirable, what the pitfalls are, how candidate animals should be studied in advance, and how they should be introduced.

Elkins, W. A., and U. C. Nelson. (US F&WS, Juneau, Alaska.) WILDLIFE INTRODUCTIONS AND TRANSPLANTS IN ALASKA. Sci. in Alaska 1954. p. 29-30. 1957.

Abstract only. Transplants of birds and mammals are reviewed in detail for the past 30 year period. A general coverage of the period 1916 to 1924 is included with brief review for earlier years. Introduction of new species is immensely popular. Some introductions have been successful, some not. Blacktail Deer generally, Snowshoe Hare and Beaver on Kodiak Island, and Mtn. Goat on Baranof Island are outstanding examples of success. Stocking of Pheasants and Muskrat were dismal failures. Muskox stocking is partially successful. Priorities and future plans are discussed.

## WILDLIFE--ECONOMIC & OTHER VALUES

Chatelain, Edward F. (US F&WS, Juneau, Alaska.) ECONOMIC AND HUNTING DATA ON THE NELCHINA CARIBOU HERD. Sci. in Alaska 1954. p. 29. 1957.

In 1953, 1,400 hunters killed about 625 caribou. Hunters using airplanes or other vehicles were most successful. Av. hunter success was 44%. Av. expenditure per caribou was $220 for total of nearly $140,000 or about $1.08 per pound. Almost all hunters were residents and about 1/3 of them had home freezers.

Palley, Marshall Nevin. A PROPOSED TECHNIQUE FOR MEASURING AND COMPARING THE ECONOMIC IMPORTANCE OF TIMBER AND WILDLAND RECREATION IN MICHIGAN. Ph.D. thesis, Mich. State U. 118 p. 1956. [From long abstract in Dissertation Abstracts 19(1).]

The "national income accounting approach of the U. S. Department of Commerce" was selected as most serviceable. For comparability of data, it is proposed that the measurement of income be carried out at consumer level when possible and that the measurement be limited to income accruing to the economy of Mich. Measurements concerning timber can be made from existing statistics. Data for measurements of recreation values are reviewed and the less satisfactory parts are identified.

## WILDLIFE--PREDATION, CROP DAMAGE, CONTROL

Anon. AUTOMATIC BAIT FEEDER FOR USE ON ORCHARD MOUSE TRAIL BUILDER. US F&WS, 59 Temple Place, Boston 11, Mass. 1-7 p., illus. June 1958.

Gives diagrams and illustrations of automatic hopper for dropping poisoned cubes of apple into artificial mouse trail made by machine to which hopper is attached. Apple cubing machine is described and illustrated. "Zinc phosphide-treated, steam-crushed oats may also be used in the Automatic Bait Feeder. Work half a day on one side of the tree rows with the apple bait, and the other half of the day with the poisoned oats on the opposite side of the tree rows."

De Ruiter, L. THE MEASUREMENT OF THE "PREY VALUE" OF PREYS. Arch. Neerland. Zool. 11(4): 524-526. 1956. [From Biol. Abs. 32(8).]

This reference is an abstract and is not abstracted in Biol. Abs.

DeWitt, James B., and Jerome F. Besser. (Patuxent Refuge, Laurel, Md.) LATEST REPORT ON U. S. FISH & WILDLIFE SERVICE RESEARCH WITH RODENT REPELLENTS. Pest Control 26(8): 22-24, 59, 1 photo. Aug. 1958.

Why rodent repellents are needed, how they are tested, and what ones are showing promise. Some of the best ones now known are too toxic, too costly, or both.

Jones, John C. (US F&WS, Wash. 25, D. C.) HOW TO CONTROL WILDLIFE PESTS IN SUBURBAN DEVELOPMENTS. Pest Control 26(8): 9, 11, 12, 13, 14, 16, 18, 20, 7 photos. Aug. 1958.

Many kinds of mammals can be pestiferous in suburban areas. Here Jones tells how to exclude, repel, or control numerous kinds of mammals that cause trouble in or around dwellings.

Morris, R. F., W. F. Cheshire, C. A. Miller, and D. G. Mott. (For. Biol. Lab., Fredericton, N. B., Can.) THE NUMERICAL RESPONSE OF AVIAN AND MAMMALIAN PREDATORS DURING A GRADATION OF THE SPRUCE BUDWORM. Ecology 39(3): 487-494, 2 figs. July 1958.

Predators may respond to changes in density of a prey population by increasing or decreasing (the numerical response), or by changing food habits (functional response). In a 10-year study in n. New Brunswick, it was found that all predators together could have little effect on a budworm outbreak. The possibility that parasites and predators may have a restraining effect on budworm populations between outbreaks is still being investigated. In the present study, some birds, particularly Bay-Breasted, Blackburnian, and Tenn. warblers, increased with the budworms, but at a much lower rate. Some other warblers--Magnolia, Myrtle, and Black-throated Green--declined, perhaps because of competition with increasing species. Rodents and insectivores appeared to fluctuate independently of budworm density. On the other hand, decreased heights of peaks in cycles of Clethrionomys gapperi and Peromyscus maniculatus may have resulted from shortage of tree seed that was caused by budworm damage. Increase of Microtus chrotorrhinus might have been associated with decrease of C. gapperi. An increase in Blarina could not be related directly to budworm density.

Newby, Fletcher, and Robert Brown. (Mont. Game Dept.) A NEW APPROACH TO PREDATOR MANAGEMENT IN MONTANA. Mont. Wildl., Aug. 1958: 22-27, 4 photos. Aug. 1958.

The predator problem in Mont. was studied through mail questionnaire of farmers and ranchers. Of the repliers who had livestock or poultry, 21% reported some loss to predators. Statewide, skunk damage to poultry and eggs was commonest. Second was bobcat predation on poultry. Third was coyote predation on sheep. Fourth was dog predation on sheep, poultry, and cattle. Financially, greatest loss was from coyotes. Regional variation in rank of predators was marked. Coyote control is a well organized state-federal activity, but farmers receive little help with other predation problems. The smaller predators have been increasing in the last decade, perhaps because of low fur prices and control of coyotes. Foxes and raccoons have extended their ranges in Mont. The best solution is the extension-trapper system, under which people are taught to handle their own predator problems by catching the individual offenders, and such a system has been started in Mont. The questionnaires showed the value of such an approach. Of the people who had suffered losses to predators, 63% had undertaken control, chiefly by shooting or trapping. Trapping was most effective control; it stopped losses in 75% of situations where used. Similar figures were 50% for shooting, 40% for poisoning, and about 50% for calling government hunter.

## WILDLIFE--REPORTS OF ORGANIZATIONS & REPORTS OF HARVESTS

Aldous, Shaler E., editor. SURVEY OF PITTMAN-ROBERTSON ACTIVITIES, 1957. US F&WS, Cir. 52. 1-164 p. Mar. [Sept.] 1958.

Third volume of useful annual reference that succeeds P-R Quarterly. Every project of each state or territory is listed with statement of number, title, leader, and objectives. This occupies p. 3-104. The next section, Program Highlights, p. 105-117, summarizes some of the more interesting or concrete

results of many projects. It is arranged by subject. Page 118 presents a table of small-game kill in each state; because of the nature of available data, game species are listed by groups such as grouse, partridge, or squirrels rather than by species. Pages 119-159 list publications that appeared during 1957 and were based on P-R work. Backs of these pages are blank so that entries can be clipped and pasted. Addresses of state and territorial game departments are provided on pages 161-162, a feature that facilitates writing for publications or information on given projects. A subject index completes the volume. These annual surveys of P-R activities make it quick and easy for anyone to find out just what is being done in P-R work and to get in touch with personnel in charge of projects of interest.

Aldous, Shaler E., compiler. SMALL GAME HARVEST. p. 118 in Survey of Pittman-Robertson Activities, 1957, US F&WS, Cir. 52. 1958.

The F&WS has long compiled annual reports on harvests of big game and fur animals, but this is the first effort to compile data for all states on numbers of small-game animals bagged. Listed for each state and territory are numbers of pheasants, quail, partridge, grouse, shore birds, doves and pigeons, rabbits, squirrels, and waterfowl shot. These categories are, of course, too broad to be of maximum value and it is to be hoped that future versions can be more specific. Whether or not they can be depends on the accuracy and detail of reports made by states. Data for the present table were taken from many sources and no doubt appeared in different forms. Most of the data are for the 1956-57 hunting season, but some are indicated as being for the 1955-56 or 1954-55 seasons. Regular, standardized reports from the states would make it possible to improve the table in this respect.

Bombay State. ANNUAL ADMINISTRATION REPORT OF THE DEPARTMENT OF WILD LIFE PRESERVATION FOR THE YEAR 1953-54. Bombay, Govt. Central Press. 1-39 p., 1 folding map. 1955. 10d. from India House, Aldwych, London W.C.2, Eng.

Bombay was the first state in India to pass legislation to meet the aims recommended by the Indian Board for Wild Life. This legislation came into effect in 1953. Steps were taken to reduce abuses in the name of crop protection, to regulate hunting, to protect rare forms, to institute closed seasons and closed areas, to enforce the rules, and to set up game sanctuaries. Policies were adopted for operation of Dandeli Game Sanctuary, an area of about 80 sq. mi. that has a great variety of fauna and flora. Forestry practices in Dandeli are to continue as before. An appendix lists the animals classified as "vermin", small game, and big game.

Cape of Good Hope. DEPARTMENT OF NATURE CONSERVATION / REPORT NO. 14 / 1957. Prov. Admin., Cape of Good Hope, Dept. Nat. Cons., Cape Town, S. Africa. 107 p., illus. 1958.

A new provincial law described here gives better protection to many kinds of birds and mammals. Bounties have been discarded. Predator-control work and research have been placed in the Dept. Nat. Cons. The Dept. does considerable amounts of educational work, but poaching is still rising, aided by 4-wheel-drive cars that can enter previously difficult areas. The report discusses these and other conservation problems, many of which are much like ours: progressive destruction of natural conditions, uninformed hunters, litterbugs, wildfire, artificial propagation, etc. One short paper tells of the upsurge of injurious baboons, rodents, and conys now that most predators are controlled. Other notes discuss the elimination of native vegetation by exotics and what can be done about it; the status and habits of Mountain Zebras in the George Division and Elephants in Knysna Forest; mammals and birds of the DeHoop Wildl. Farm; and work done in protecting and propagating birds and mammals at DeHoop Wildl. Farm and Jonkershoek Nature Reserve. The volume also contains reports of the divisions of Museums and Inland Fisheries.

ITBON WERKZAAMHEDEN IN 1957 / ANNUAL REPORT INSTITUTE FOR BIOLOGICAL FIELD RESEARCH. ITBON, Kemperbergerweg 11, Arnhem, Netherlands. Mededeling nr. 38. 1-34 p., illus. 1958.

In Dutch with 1.5 p. English summary. The Institute has 4 divisions. They are devoted to wildlife research, forest entomology, soil communities, and free-living communities. In the Division for Wildlife Research, the following investigations were carried out: "1. The level at which game species may be maintained in different parts of the country. A stock-taking of roe-deer was carried

out in several areas; density was correlated with damage. 2. Observations were made on bone-tar-oil as a repellent against deer, roe-deer, hares and rabbits. [See WR 92 p. 24.] 3. The food of game species was analysed throughout the year. 4. Investigations were carried out on the influence of decoys on population-density of ducks. Migration, reproduction and mortality among duck-population is studied. 5. Some minor problems have been investigated, e.g. minor migration of pheasants, and the causes of the decrease of the partridge population. Apart from the above, investigations were carried out on the possibility of harmonising nature conservation and the recreation of large numbers of city dwellers in the dunes, the results of which will be published in the course of 1958... A list of publications is given..."

KENYA WILD LIFE SOCIETY. SECOND ANNUAL REPORT 1957. Kenya Wild Life Soc., P. O. Box 20110, Nairobi. 106 p., illus. 1958. 3s.

A highly informative and handsomely illustrated volume on the terrific conservation problems of East Africa. The problem of wholesale poaching of elephants and other big game in Kenya and Tanganyika is presented with listings of materials confiscated and discussion of measures needed to reduce poaching. Principles and recommendations for redefining and handling the Serengeti National Park in Tanganyika are described in detail. Game management is discussed in the light of protecting Africa's game species while still benefiting the country economically. Designation of Lake Nakuru as a waterfowl refuge is recommended and a list of the birds of this region is given. The setting aside of areas as sanctuaries for waterfowl, for species of animals in danger of extinction, and for preservation of unique floral areas is urged. A series of articles entitled "Deserts Waiting" depicts the critical erosion situation that already exists owing to widespread overgrazing.--W. T. Van Velzen.

Louisiana. SEVENTH BIENNIAL REPORT / LOUISIANA WILD LIFE AND FISHERIES COMMISSION 1956-1957. viii + 220 p., illus. 1958.

A large, informative volume that includes many technical and semitechnical project reports. The fur division reports the fur take, by species, for the years 1940-57; it also tells of restocking muskrats on hurricane-depleted Marsh Is. Refuge, of successful efforts to popularize nutria flesh for human and animal food, and of the need of a domestic market for southern furs. The refuge division tells about the effects of a hurricane on refuges, what is being done to restore and manage refuges, and waterfowl use of refuges. Other reports deal with management work done, and its results, on public hunting areas and game management areas. Good progress in controlling water hyacinth is described; research on other aquatic weeds is mentioned. Studies of deer populations and deer browse conditions in various areas are discussed. Transplants of deer and beaver are reported. Waterfowl kill and inventory data are discussed and tabulated; banding work also is discussed. Studies of various lengths are presented for doves, turkey, quail, squirrels, and rabbits. The squirrel study includes tables on breeding and kill. Data are given on production of oak mast, 1954-56, and on the relation of oak mast and squirrel populations to timber stand improvement. Importance of river-basin studies is brought out, and some recent problems in this field are discussed. Quantitative data on hunting pressure and game kills in the period 1953-56 is supplied on the basis of a questionnaire survey. The volume also contains much technical information on pollution, fisheries, and shell-fisheries.

## WETLANDS & WILDLIFE

Arata, Andrew A. (S. Ill. U., Carbondale.) NOTES ON THE ECOLOGY OF AMERICAN LOTUS IN SOUTHERN ILLINOIS. Trans. Ill. State Acad. Sci. 50: 71-75, 2 graphs. 1957.

This generally undesirable plant was studied because it was 1 of the species to be tested in strip-mine ponds. Summary: "1. Immersion of [Nelumbo] lutea fruits in concentrated $H_2SO_4$ for 5 hours was found to be the most feasible method of scarification, assuring initial germination within 24 to 35 hours, and yielding 95% germination. 2. Absorption of water by fruits is rapid at first, gradually tapering off until germination. 3. The average amount of water absorbed during the 24-hour period following scarification was 0.934 gm. (90.7%

of the dry fruit weight); the average volume increase was 1.003 mls. (119% of the dry fruit volume). 4. Fifty-five thousand leaves per acre were recorded, 17% of which were elevated; an average of 8,500 flowers per acre was determined, calculated to yield more than 400 lbs. of fruit per year. 5. An annual productivity of 6.5 tons air-dry weight per acre was calculated. 6. Lotus probably plays an important role in the succession of the areas in which it grows."

Critcher, T. Stuart. (N. C. Wildl. Resources Comm.) PRODUCTION OF WATERFOWL FOODS BY THE SUMMER DRAW-DOWN METHOD. N. C. Wildl. 22(7): 15, 19. July 1958.
Short, informative article on how small private areas can be managed for ducks by means of draw-down. Size, location, control of water levels, and satisfactory food plants are discussed. The one most satisfactory food plant for normally dry soils of draw-downs in N. C. is browntop millet.

Dorer, Richard J. (Minn. Dept. Cons.) MINNESOTA SAVES ITS WETLANDS. Outdoor Am. 23(4): 6-7. Apr. 1958.
Minnesota's wetlands were and are being drained at a terrific rate, but something is being done about it. The state appropriated $200,000 for purchase, added a $1.00 surcharge to the small game license for the purpose, provided $200,000 a year for 6 years from PR funds, and empowered the Commissioner of Conservation to accept donations. Donations totaled $17,000 by end of 1957. By then 463 tracts totaling 40,455 acres had been bought or optioned at cost of $1,119,321. The campaign is leading some agriculturists to view water and wildlife more seriously; planners of one drainage project reserved 71 marshes, provided owners were willing to put them under the wetlands program.

Lawrence, J. M. (Agr. Exp. Sta., Auburn, Ala.) RECENT INVESTIGATIONS ON THE USE OF SODIUM ARSENITE AS AN ALGACIDE AND ITS EFFECTS ON FISH PRODUCTION IN PONDS. Proc. 11th Ann. Conf. SE. Assn. Game & Fish Comms.: 281-287, 1 fig. 1957 (1958).
New apparatus for application of arsenite was developed. One or more applications of 4 p.p.m. $As_2O_3$ as sodium arsenite gave fairly satisfactory control of the algae Pithophora and Hydrodictyon if made when algae were in actively growing stage, but were less effective when algae were mature. The treatments greatly reduced numbers of invertebrate fish-food organisms; probably this explains poor growth and reproduction of the fish.

Snow, J. R. (US F&WS, Marion, Ala.) ALGAE CONTROL IN WARMWATER HATCHERY PONDS. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 80-85. 1956 (1957).
Abstract: "Control of Hydrodictyon reticulatum Lagerh. and Pithophora oedogonia Wittr. in warmwater hatchery ponds using copper sulfate, sodium arsenite and abietylamine acetate [Delrad] is discussed. Some of the disadvantages of these chemicals as algicides for hatchery use are presented. A method of controlling the above species of vegetation in hatchery ponds using abietylamine acetate is described and recommended for use where either copper sulfate or sodium arsenite has not given satisfactory results."

Sullivan, Carl. (W. Va. Cons. Comm.) HIGHWAY DAMS: WATER FOR THE FUTURE. W. Va. Cons. 22(6): 1-5, 7 figs. Aug. 1958.
The new federal highway program offers terrific opportunities for states to create many fish or wildlife impoundments. Highway fills across low areas need relatively minor changes to be acceptable dams. These changes, however, must be planned in advance and made when the fill is constructed. As the highway program is gaining force rapidly, there is no time to be lost. Conservation groups must pay the difference in construction costs, but in so doing they get 5 to 10 times their money's worth. As of Jan. 1956, 45 of these projects were completed in 10 states. The impoundments varied from 1 to 1200 acres and av. 130 acres. An av. of $23,000 per project was saved by taking advantage of highway construction. Federal highway authorities are agreeable to the plan, but in some states special legislation is necessary--and will have to be obtained promptly. Added construction costs often can be gained through P-R or D-J funds or from local groups, and here again early planning and action are needed.

Wallace, H. E., committee chairman. (Fla. Game Comm.) OUR PROFESSIONAL NEGLECT OF THE WATER USE PROBLEM--AND A REMEDIAL APPROACH. Proc. 11th Ann. Conf. SE. Assn. Game & Fish Comms.: 60-61. 1957 (1958).

"We scream about dams, dikes, canals, and drainage but we often have only ourselves to blame if the project goes through without regard to fish and wildlife interests. All projects are not bad and most projects can be improved if we but make the proper study and submit and promote our recommendations." The committee recommended: 1. That each conservation department appoint 1 suitable man to represent it on water-use matters. The work would take little time at first and the man could continue on his other duties. 2. The man should go to the Corps of Engineers and get a list of water projects for the state. 3. He should note on the list each project that affects fish and wildlife values. 4. Next he should note whether or not a study of each pertinent project is under way. 5. Lists from each state should be submitted to the SE. Assn. and perhaps published in state game journals. These procedures will spotlight needs and stimulate action. This work is too vast to be left up to the Office of River Basin Studies of the F&WS. That Office has neither the time, equipment, money, nor staff to do the job adequately by itself.

Weller, Milton W., Billy H. Wingfield, and Jessop B. Low. (Iowa State Coll., Ames.) EFFECTS OF HABITAT DETERIORATION ON BIRD POPULATIONS OF A SMALL UTAH MARSH. Condor 60(4): 220-226, 2 photos. July 1958.

Summary: "Bird populations of a small Utah marsh [Knudson Marsh, in mouth of Bear R.] were studied intensively during 1950 and 1955. During 1950, the vegetation was lush and held large populations of ducks, geese, and wading birds. Nests of Anatidae were most abundant; 6.6 nests were found per acre of vegetation. Colonies of the Great Blue Heron, Black-crowned Night Heron, Snowy Egret, and White-faced Ibis were present. Drought conditions prevailed from 1952 through 1955, and irrigation demands reduced water available to the marsh. Deterioration of the vegetation from lack of water and intensive over-grazing by cattle was reflected in the bird populations. Duck populations dropped from 6.6 to 2.6 nests per acre and the colonies of all wading birds except the Great Blue Herons disappeared; the latter declined 92 per cent. Especially significant was the disappearance of deep-water species such as the Pied-billed Grebe, Western Grebe, and Ruddy Duck. Only the Gadwall, a bird of dry land nesting habits, increased slightly." "The quality of the Knudson Marsh warrants protection from both grazing and adverse water conditions. Similar conditions exist in other small marshes in the Great Basin. The purchase of such critical areas is often impossible, but long-term leases, cattle fencing, and inexpensive water control structures might preserve and maintain their productivity."

Wood, Roy, Roy Grizzell, and Charles K. Rawls. (US F&WS, Peachtree 7th Bldg., Atlanta, Ga.) WATER USE AND THE FUTURE OF FISH AND WILDLIFE CONSERVATION. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 100-112. 1956 (1957).

Valuable and stimulating committee report that cites many interesting and concrete examples of what can be and is being done for fish and wildlife in relation to water use. "...the first part of this paper deals with a discussion of trends and changing concepts of water use as viewed at the national, state, and local levels. The second part reviews sound management practices involving water use with conclusion and recommendations as to action which should be taken to implement them."

## FARMLAND & WILDLIFE

Belcher, Margaret. (Regina, Sask., Can.) BIRD NOTES FROM A FARM SHELTERBELT. Blue Jay 16(3): 101-104. Sept. 1958.

Good data on bird use of a maple and caragana shelterbelt at Dilke, Sask. Some changes through the years are discussed and a census is reported for 1 year.

Caborn, J. M. SHELTERBELTS AND MICROCLIMATE. Great Britain For. Comm. (London), Bul. no. 29. 135 p., illus. 1957. 17s. 6d. [From J. For. 56(8).]

Dickerson, L. M. (P. O. Box 686, Tappahannock, Va.) CLIMATIC INFLUENCES ON THE AVAILABILITY OF SHRUB LESPEDEZA SEED FOR QUAIL. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 182-189, 5 figs. 1956 (1957).

Summary: "Measurements were made of (1) seed produced and (2) available quail food accumulated in shrub lespedeza borders. The period covered was one of progressively severe droughts. The locations studied represent a critical 200 mile range of latitude just outside the optimum climate range of shrub lespedezas in Southeastern United States. Early frost was a factor in reducing seed yields. During drought years, and delayed blooming, late frosts damaged the crop. Substitution of early maturing varieties of Lespedeza japonica for the later maturing L. bicolor is recommended. Further extension of the range of usefulness of the shrub lespedeza depends upon selection and development of varieties that mature even earlier than those now in use." Quantitative results are presented in tables and graphs. Area of study was ne. N. C. and se. Va.

Durrell, James S. (Ky. Dept. Wildl. Resources.) RESULTS OF KENTUCKY'S WILDLIFE PLANT AND SEED DISTRIBUTION PROGRAM FROM 1949 TO 1956. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 197-209, map, graph. 1956 (1957).

Quantitative report and discussion of policy. It is important to measure results of distributing planting stock, for wastage may run from 50% to over 90%. The present project measured results chiefly by inspection of plots during first growing season. Later results were determined largely from questionnaires, 30% of which were returned. Acres of successful plantings of shrub lespedeza rose from 4 in 1949 to 57 in 1956; the percentage of plots rated as good rose from 32 to 72. Amounts of Multiflora Rose planted varied widely; success varied from 16 to 48% of plants. Figures are given on amounts of Sericea and Korean Lespedeza seed and sorghum seed distributed. Korean Lespedeza is useful, but is soon choked out by competition, seed may be consumed too early in season, and farmers don't feel they are getting much from state. Sorghums are easily grown; they concentrate quail in hunting season, but do not hold food until late enough in season. Food-patch mixtures are promising but not yet tried much in Ky. Shrub lespedeza was reported to be effective both in feeding quail and holding quail for shooting; quail were shot at 59% of good plots. Author believes that shrub lespedeza is truly valuable to quail, and that it is easier to plant and maintain than most other plants. Success with these plants is best if good-sized, freshly-dug stock is used, and if follow-up visits are made by conservation officers. In Ky., shrub lespedeza matured 50-87% of its seed before frost and produced 158-800 lbs. seed/acre. Details are given of success of shrub lespedeza in different parts of Ky., and the relation of success to such factors as soil conditions, weather, and competition. No greater success in getting wildlife plantings established on private farmland was achieved by concentrating on a few selected farms than by working with larger numbers. Cooperation with county agricultural officials was helpful, for farmers responded best to advice from county men.

I.C.I. Game Services. GAME AND THE FARMER. I.C.I. Game Res. Sta. (Fordingbridge, Hampshire, Eng.), Advisory Booklet no. 20. 1-33 p., illus. 1956, revised Summer 1958.

This booklet is adapted to conditions in Britain and has less application to management in the U. S. than might be expected. Some conditions and problems, however, occur almost everywhere. Furthermore, the booklet is of interest in showing what is recommended to farmers in a country where land use is intensive and relatively heavy populations of game birds are desired. One wonders if the methods of U. S. commercial shooting preserves would not be cheaper. Surely they would be preferable in the interest of general wildlife conservation, for the I.C.I. advises the traditional predator control of very intensive nature--practically all animals except game birds and song birds are to be as nearly exterminated as feasible. Other sections of the booklet tell how to protect natural nests, how to reduce mowing losses, what precautions to take in using pesticides, give instructions for artificial propagation of pheasants and Perdix, and suggest provision of winter food either by artificial feeding or special plantings. It is interesting to note that landowners are advised to leave enough birds unshot to allow for over-winter mortality of at least 30%. In America it is generally believed that heavy shooting reduces winter mortality from other causes. Perhaps the difference reflects less restricted shooting and/or less protective cover in Britain. It may also reflect a desire in Britain for a larger carry-over of breeders than is considered practical in America.

FARMLAND & WILDLIFE--Continued

Redd, John B. (Va. Comm. Game.) PREPARE NOW FOR WILDLIFE. Va. Wildl. 19 (9): 8-9, 3 photos. Sept. 1958.

Brief article on how to manage farmland for wildlife, especially rabbits. Listed are such techniques as fencing woods, edge-cutting woods, planting cover along fence rows and in odd spots, and, where necessary, control of trees. More information is given on where and how to plant red and ladino clovers, grasses, and annual food patches. Use of rotary power mower is recommended to control brush and provide succulent food. Strips 20-30 ft. wide should be mowed 3-4 times during growing season to produce fresh growth adjacent to cover.

Reed, Ralph A. THE GREAT PLAINS SHELTERBELT IN 1954. U. Nebr. Coll. Agr., Exp. Sta., Lincoln. 125 p., illus. 1958. No price stated. [From J. Soil & Water Cons. 13(5).]

Schmid, Frederick C. (Patuxent Refuge, Laurel, Md.) CEDAR WAXWINGS AND FOX SPARROWS FEED UPON MULTIFLORA ROSE. Wilson Bul. 70(2): 194-195. June 1958.

Mockingbirds at the Patuxent Res. Refuge subsist almost entirely on fruits of multiflora in winter. In the winter of 1955-56, a large flock of Cedar Waxwings ate great quantities of the hips and regurgitated the seeds thickly (52 per sq. ft. in 1 sample) under their perches. Later in the winter a flight of Fox Sparrows ate many of the seeds regurgitated by the waxwings. [It may be added that nearly every piece of roadside or other idle land on the Refuge that is under a wire or other bird perch has a vigorous stand of volunteer multiflora. It is reported that birds are even spreading the plant into the woods. Control of such scattered and wide-spread colonies is not feasible.]

Steele, John L., Jr. (Okla. Dept. Wildl. Cons.) FARMING FOR WILDLIFE. Okla. Wildl. 14(9): 4-8, 7 photos. Sept. 1958.

Describes the many farming and wildlife management practices that are used successfully at the Canton Public Hunting Area, Okla. Emphasis is on management for quail, but many of the practices are of value to other animals.

Van Doren, C. A., and O. E. Hays. INTERSEEDING LEGUMES IN CORN. US Dept. Agr., Leafl. no. 435. 1-8 p., 4 photos. July 1958. 5¢ from Supt. Documents.

The practice of planting legumes between widely spaced rows of corn can be good for wildlife and good for agriculture. This leaflet tells how the method is used, what the requirements for it are, and what the drawbacks may be.

RANGELAND & WILDLIFE

Branson, F. A., and G. F. Payne. (US Geol. Surv., Denver, Colo.) EFFECTS OF SHEEP AND GOPHERS ON MEADOWS OF THE BRIDGER MOUNTAINS OF MONTANA. J. Range Mgt. 11(4): 165-169, 1 photo. July 1958.

13-year study of effects on vegetation. Gophers caused a decrease in some of the grasses of low productivity and a decrease in 2 forbs that were not considered desirable on the range. In these respects the gophers were beneficial. Sheep reduced populations of plants most preferred by sheep. This probably made the range less desirable for sheep grazing but perhaps better for cattle.

Cole, Glen F. (Mont. Dept. Game, Helena.) RANGE SURVEY GUIDE. Mont. Dept. Fish & Game, Fed. Aid Proj. W-37-R. 21 p., 4 figs. 1958.

Neatly prepared pocket guide (7 x 4 x 1/8 in.) that "outlines procedures for conducting condition and utilization surveys on key forage species within key range areas." The first section tells how to study browse plants by the closest-plant sampling technique. The second section gives instruction for study of bunchgrass range by use of 100 x 250 ft. plots. Equipment needed is listed and procedures are described step by step. Sample form sheets are included at the back.

Coupland, Robert T. (U. Sask., Saskatoon.) THE EFFECTS OF FLUCTUATIONS IN WEATHER UPON THE GRASSLANDS OF THE GREAT PLAINS. Bot. Rev. 24(5): 273-317, 1 map. May 1958.

Useful review paper that describes the region and its climate and vegetation; discusses its precipitation, temperature, evaporation, and wind; and reports on effect of weather fluctuations on forage yield, density, floristic composition, and adaptability of species. Bibliography of 136 references.

Heady, Harold F. (Sch. For., U. Calif., Berkeley.) VEGETATIONAL CHANGES IN THE CALIFORNIA ANNUAL TYPE. Ecology 39(3): 402-416, 16 figs. July 1958.

Detailed report of 5-year study at Hopland Field Station.

Johnson, W. M. (Rocky Mtn. For. & Range Exp. Sta., Ft. Collins, Colo.) REINVASION OF BIG SAGEBRUSH FOLLOWING CHEMICAL CONTROL. J. Range Mgt. 11(4): 169-172, 2 photos. July 1958.

Seedlings of big sagebrush seemed most numerous where 40-60% of original plants were killed. Seedlings did not become established every year. Establishment of seedlings was very low and mortality of small plants was high. Seedlings were almost absent on areas protected from grazing. Young plants were scarcer on ungrazed than on grazed areas. Young plants were most abundant where the kill was light.

Talbot, M. W. INDICATORS OF SOUTHWESTERN RANGE CONDITION. US Dept. Agr., Farmers' Bul. 1782. 36 p. Dec. 1937. [Slightly revised, 1958.]

Wagnon, K. A., J. R. Bentley, and L. R. Green. (U. Calif., Davis.) STEER GAINS ON ANNUAL-PLANT RANGE PASTURES FERTILIZED WITH SULPHUR. J. Range Mgt. 11 (4): 177-182, 1 fig. July 1958.

"Sulfur fertilization of annual type ranges provided substantial increases in range stocking and in average steer gains during the green-forage and dry-forage seasons." This was not true in winter.

## FORESTLAND--FORESTRY & ECOLOGY

Habeck, James R. (U. Wis., Madison.) WHITE CEDAR ECOTYPES IN WISCONSIN. Ecology 39(3): 457-463, 4 figs. July 1958.

"In programs of white cedar re-establishment, consideration should be given to the fact that ecotypes exist and the collection of seed to be used in re-establishment should be done carefully."

Hunt, John Clark. (US Bur. Land Mgt., Portland, Ore.) BURNING ALASKA. Am. For. 64(8): 12-15, 40-42, 7 photos. Aug. 1958.

More than 5,000,000 acres of Alaskan forest and wildlife land burned over in 1957--the worst fire season of recent years. Wildlife and timber losses were more than $30,000,000. Alaska is more than twice as large as Texas. Its area that needs fire protection is larger than Calif., Ore., and Wash. combined. Four-fifths of this area has been burned in the last 60 years. White men, natives, and lightning all started fires. Men set many fires deliberately, as they did when the U. S. was being opened up, and they give many pretexts for doing so. Attempts at fire control began only in 1939 and the effort is still on a shoestring. Interior Alaska has a fire season of 5-6 months. Great fires may ravage huge areas of forest or tundra without being reported until too late. Twenty to 30 fires may be burning at once. Many of these fires ruin a region for wildlife or forestry for 40 to 100 years. Alaskan forests are similar to those of Scandinavia and can be equally valuable. Alaskan fish, wildlife, fur, and recreational resources are of dominant importance to the state's economy. Yet under statehood the fire problem will increase with settlement. Federal fire-fighting authorities have done well with what little they have had to work with. They have sound plans for improved and expanded fire control, but they need the tools and manpower with which to work.

Lindsey, A. A., James D. Barton, Jr., and S. R. Miles. (Purdue U., Lafayette, Ind.) FIELD EFFICIENCIES OF FOREST SAMPLING METHODS. Ecology 39(3): 428-444, 7 figs. July 1958.

Experimental study demonstrated that the least time-consuming method that gave results within specified limits of accuracy was the "combination of the rangefinder circle and the Bitterlich method." Use of 4-lb. tape recorder is recommended for field recording data.

Ward, Richard T. (Colo. State U., Ft. Collins.) THE BEECH FORESTS OF WISCONSIN--THEIR PHYTOSOCIOLOGY AND RELATIONSHIPS TO FORESTS OF THE STATE WITHOUT BEECH. Ecology 39(3): 444-457, 5 figs. July 1958.

FORESTLAND--MANAGEMENT FOR & DAMAGE BY WILDLIFE

Arnold, Floyd, and Donald J. Hankla. (N. C. Wildl. Resources Comm.) GOOD FORESTRY CAN MAKE GOOD HUNTING. Wildl. in N. C. 22(9): 14-17, 4 photos. Sept. 1958.

Many landowners, large and small, are now leasing hunting rights. This trend is expected to continue until hunting on most commercial forest land is restricted to those who pay. With hunting privileges assuming financial value, it is reasonable to expect wildlife to have proportionate consideration in timberland budgets. Many things can be done to harmonize management of timber and wildlife. Scarification of soil to permit tree reproduction favors wildlife for years. It is best if done on scattered or checkerboarded blocks rather than large tracts. Release cuttings open the canopy and favor game, especially if enough den and mast trees are left. Prescribed burning is valuable for both timber and game, but must be done professionally--and generally restricted to sandy soils. It too is best done by scattered blocks, each burned every 3-4 years. Thinning is now commercially profitable; it can favor game by increasing herbaceous ground cover. Timber stand improvement can be beneficial in the same way--if enough den and mast trees are left, and it is usually feasible to do so with planning and training. Prevention of wildfire is important to both timber and game. Access roads are essential to forestry and can be of great wildlife value if planted to low perennial vegetation; this also helps maintain the roads. The most indispensable step of all is inclusion of simple provision for wildlife in policy and operation planning.

Bateman, Bryant A. (La. State U., Baton Rouge.) GAME AND TIMBER GO TOGETHER! La. Cons. 10(9): 4-5, 2 photos. Sept. 1958.

"Louisiana has no game species that prefers a pure coniferous habitat. In fact, it is doubtful that any of our species could exist in a forest devoid of broadleaf trees and shrubs." Dr. Bateman explains briefly what types of forest habitats different game species prefer. He then presents sets of practices recommended for pine or pine-hardwood forests, for Bobwhites in such forests, and for delta hardwood forests. Recommendations pertain to leaving adequate numbers of mast-producing trees and shrubs, preserving suitable numbers of den trees, leaving clumps of hardwoods and brush, using fire properly, excluding livestock, and providing ponds. A table shows relative values of many kinds of trees to specific types of game. Shrubs and vines of wildlife value in La. are listed.

Besser, Jerome F., and Ralph Dutton, compilers. MEADOW MOUSE REPELLENT STUDIES (1957-1958) / PROGRESS REPORT NO. 1. US F&WS, Wildl. Res. Lab., Denver 2, Colo. 6 p., mimeo. Sept. 1958.

Formulations of 10% ZAC and 10% TMTD were sprayed on conifer seedlings. They gave fair to good protection of larger seedlings, fair to no protection of small seedlings. Drought and other factors complicated results and tests should be rerun. Douglas-fir seedlings were the most vulnerable to vole damage of the tree seedlings tested, and therefore should be the coniferous species used in further tests.

Broadfoot, W. M. (S. For. Exp. Sta., New Orleans 13, La.) STUDY EFFECTS OF IMPOUNDED WATER ON TREES. Miss. Game & Fish 21(12): 6, 10, 2 photos. July 1958. Reprinted from Miss. Farm Research.

"In recent years farmers and sportsmen have built many temporary shallow-water impoundments in southern hardwood forests. While the main purpose has been to attract waterfowl, a recent study shows that these forest lakes, if properly managed, can also benefit the timber. The impoundments are generally created by constructing low dikes and dams in flats and sloughs. They are built in time to catch the rains of fall and early winter, as most of the low lands are dry by late autumn. When the rains are light or delayed, water is sometimes pumped into the diked areas from wells, streams, or canals. Impoundments in oak woodlands are especially attractive to mallard ducks, which feed on the mast. As some forest owners are concerned that the water might damage the trees, the Southern Forest Experiment Station studied 16 impoundments in Mississippi and Arkansas, representing a variety of flooding conditions. Briefly, the study showed that impoundments increase the amount of water that goes into soil storage; this extra moisture is especially beneficial to trees during dry summers. But it showed also that the impoundments should be drained promptly each spring. Letting the water stand all year reduced growth for most tree species, and killed others."

Dick, James, J. M. Finnis, Lee O. Hunt, and Nelson B. Kverno. (621 W. 6th St., Centralia, Wash.) TREATMENT OF DOUGLAS-FIR SEED TO REDUCE LOSS TO RODENTS. J. For. 56(9): 660-661, 1 graph. Sept. 1958.

Summary: "A cooperative factorial experiment was conducted in British Columbia, Washington, and Oregon on direct seeding of Douglas-fir. A total of 36 0.1-acre plots were broadcast at the rate of one pound per acre with endrin-coated seed. The addition of the fungicide Arasan 75 to the endrin coating proved unnecessary. The substitution of Dow Latex 512-R for methocel-rhoplex as the binder proved satisfactory. Outcome was measured by first-season stocking which averaged 2,610 seedlings per acre. This indicates satisfactory rodent control by the endrin coating and, with reasonable survival, should prove adequate reproduction."

Gysel, Leslie W. (Mich. State U., E. Lansing.) PREDICTION OF ACORN CROPS. For. Sci. 4(3): 239-245, 3 figs. Sept. 1958.

Possibilities of determining the size of acorn crops by counting the number of flowers or immature acorns were tested in a 6-year study in s. Mich. All counts were made on tall, mature trees of Red Oak and White Oak groups with a spotting scope, generally with a 30X eye-piece. If no flowers are produced, the acorn crop of species of the Red Oak group will be a failure 16 to 18 months later. Lack of flowers on trees of the White Oak group would result in a poor crop during the same year. If flowers are produced, acorns may or may not develop from them. Losses of immature acorns may occur at any time. Therefore, there appears to be no absolute method for early prediction of the size of a crop of mature acorns, unless no flowers or immature acorns are produced. Early predictions can indicate the potential size of a crop; the actual size can be determined only by later observations or check counts.--Author.

Hooven, Edward. FIELD TEST OF ENDRIN-TREATED DOUGLAS FIR SEED. Ore. For. Lands Res. Center (Box 571, Corvallis), Res. Note no. 28. 1 + 8 p., 2 graphs. Dec. 1957.

Three 10-acre plots were established in the Tillamook burn of nw. Ore. Small mammals of the plots were live trapped, marked, and released. Two of the plots were planted with seed treated with Endrin and adhesive. One plot was planted with untreated seed. Small mammals of Endrin plots dropped to zero or nearly zero. Apparently both residents and invaders were killed. As to germination of seeds, "Of 100 one-milacre samples per experimental plot an average of 51 percent were stocked on the treated areas and 13 percent on the untreated area. A firebreak seeding (not a part of the original experiment) sown with tetramine treated Douglas fir seed produced 43 percent on 100 one-milacre sample plots." "Endrin has the advantage, however, of being available at low cost in sufficient quantities for operational project use." Deer mice were the animals of chief concern. The name "Microtus thomasi" in the author's tables presumably is a lapsus for M. townsendii.

I.C.I. Game Services. FORESTRY AND PHEASANTS. I.C.I. Game Res. Sta. (Fordingbridge, Hampshire, Eng.), Advisory Booklet no. 15. 1-47 p., illus. 1954, revised Summer 1958.

New forests are being planted in Britain and old ones are coming under better management. They can do much for hunters if planned and managed with shooting and game needs in mind. This booklet gives an impressive amount of information on how this can be done. Some of the plans pertain only to shooting driven birds. Some require a degree of management of vegetation that would be practical in the U. S. only on private or commercial shooting preserves; they should, of course, be seriously considered for such places. Other parts of the booklet are of interest to anyone planning for farm game or for forest game in farming country. Appendices of the booklet consist of tables on selection and spacing of trees and shrubs. In general, the booklet points out the wildlife advantages of having woods of mixed type and mixed age, and of keeping them that way by cropping. It tells how to plan new woods so as to provide game (particularly pheasant) habitat, and how to lay out shooting lanes between blocks of timber. Provision of food and water in and near woods is discussed. Management of old woods for game use and shooting is described. Good suggestions are given on value and management of hedges and shelterbelts for game, timber, and protection of crops. The page on "remises" is interesting. Remises are small game coverts of an acre or two that are often created around old mounds, pits, or banks. They may have an outer ring of hedged spruce, an inner ring of alder, and a core of hardwoods. Low-growing, food-producing plants may be planted around the outside, and supplemented by artificial feeding in winter. Remises are best if scattered about closely enough that game animals can travel easily between them. They utilize odd areas and beautify the landscape.

McClure, Norman R. (US Soil Cons. Serv., Plant Materials Center, Pullman, Wash.) GRASS SEEDINGS ON LODGEPOLE PINE BURNS IN THE NORTHWEST. J. Range Mgt. 11(4): 183-186, 3 photos. July 1958.

"Three field-scale plantings of perennial grasses were made in consecutive years following clear-cut logging and controlled burning of lodgepole pine. Orchard grass, Manchar brome, timothy, and tall oatgrass became readily established and by the second year provided excellent ground cover and a considerable volume of feed for livestock. Erosion and weed control, and forage and watershed values obtained have been convincing evidence of the economic feasibility and conservation value of seeding perennial grasses following fire in lodgepole pine."

Murry, Robert E., and C. H. Lewis, Jr. (La. Wild Life Comm.) A RECENTLY DEVELOPED FORESTRY PLANTING TECHNIQUE FAVORABLE TO BOBWHITE QUAIL. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 242-244. 1956 (1957).

To reestablish Longleaf Pine, the treatment now preferred by the Crosby Chem. Co. in La. is to disk 9-ft. strips 7 ft. apart in spring, disk again in late summer or fall, and then plant seed. The strips are quickly occupied by native quail-food plants and provide food for years. Where suitable woody cover is present, year-round quail range is created. The Longleaf Pine stands that grow up are more favorable to quail than stands of either Loblolly or Slash Pine, partly because Longleaf stands have wider spacing, thinner crowns, slower crown closure, and more liberal use of fire as a silvicultural tool. The paper lists many of the plants that volunteer in the disked strips.

Sharp, Ward M. (Pa. State U., U. Park.) EVALUATING MAST YIELDS IN THE OAKS. Pa. Agr. Exp. Sta. (U. Park), Bul. 635. i + 22 p., 6 figs. Aug. 1958.

A long paper that discusses in detail the fruiting habits of different kinds of oaks, factors that affect yield, methods of estimating yield, precautions to be taken in making estimates, and methods of surveying mast yield of a whole state by properly randomized samples. "Acorn yields are rated on fruiting rank or percentage of acorns produced in a growing season in relation to potential maximum yield. A heavy or bumper crop represents 76 to 100 per cent of maximum yield, whereas a poor crop represents less than 25 per cent. Rank is computed from numbers of acorns borne on lateral or terminal branches 24 inches in length."

Strode, Donald D. (Fla. Game Comm., Tallahassee.) A PRELIMINARY REPORT OF THE EFFECTS OF THE T.S.I. PROGRAM ON THE WILDLIFE HABITAT IN THE OCALA NATIONAL FOREST. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 59-68. 1956 (1957).
Quantitative study of oaks cut in timber stand improvement (T.S.I.) in various timber types, and appraisal of what these changes meant to different kinds of game. Specific recommendations are made for modifying T.S.I. to aid game animals. For general summary of findings, see review of similar paper by Strode, WR 88: 24.

Van Alstine, J. N. (Jefferson Natl. For., Roanoke, Va.) PINE PLANTATIONS IN HARDWOOD STANDS BENEFIT WILDLIFE (AN EXAMPLE OF TIMBER AND WILDLIFE MANAGEMENT COORDINATION). Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 51-52. 1956 (1957).
The Jefferson Natl. For., Va., has large acreages of poor-site hardwoods. In 1949, a 5-acre strip 60-100 feet wide was cleared of hardwoods and planted with conifers. Hardwood sprouts were kept cut out (now probably would be treated with herbicides). Red and White Pines did well and will be of commercial value. The area is heavily utilized by deer and grouse. More such plantations will be created with cooperation of Va. Game Comm., but probably it will not be feasible to replace more than 1-2% of the forest's hardwoods with pine.

Yambert, D. W., Jr. (Tenn. Game Comm.) A PLAN FOR STATE USE OF WILDLIFE RESOURCES ON A PRIVATE TIMBER TRACT. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 44-47. 1956 (1957).
Describes legal and practical arrangements made by Tenn. Game Comm. with corporate owner of extensive timberlands. State got control of hunting rights for public. Owner got assistance with fire protection in form of state personnel and better public relations.

## STRIPPED LAND & MISCELLANEOUS HABITATS

Brewer, Richard. (U. Ill., Champaign.) BREEDING-BIRD POPULATIONS OF STRIP-MINE LAND IN PERRY COUNTY, ILLINOIS. Ecology 39(3): 543-545. July 1958.
Summary: "Bird populations of Perry Co., Illinois, lands stripped for coal between 1932 and 1950 were studied during the breeding seasons of 1954-56. The lands stripped during various years were similar, consisting of alternate ridges and valleys supporting wide-spaced trees and a ground cover of ruderals. Increasing tree size, increasing shade, and the appearance of dense, shrubby growth and elm saplings were associated with increasing time since stripping. Forty-four breeding species were recorded. Most abundant were field sparrow, indigo bunting, mourning dove, and cardinal. Most of the recorded species may be classified as forest-edge birds; that is, they occur where there is an interspersion of trees and/or shrubs in an area covered by herbs. Differences in the bird populations of land stripped in different years were the result of responses of individual species to successional changes in vegetation and to local site conditions. Future successional changes in the bird population, involving replacement of field and forest-edge birds with forest species, will probably depend on the development of a closed canopy."

Collins, Francis W. (Box 236, Earlington, Ky.) GAME MANAGEMENT PRACTICES ON STRIP MINED LAND. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 213-221, 5 figs. 1956 (1957).
Describes conditions in stripped lands in Ky., tells of the kinds of game and fur animals that use the lands, presents diagrams of planting plans for various sites, and discusses acidity tolerance and utility of several kinds of native and introduced plants. Apparently many kinds of plants and animals find even quite acid water and soil acceptable. A trapper operating on a tract that had about 10 acres of ponds and marshes caught 86 muskrats and 14 mink for a return of $40.90 per acre of water. An attempt to establish chukars gave preliminary promise, for the birds seemed to take well to the rocky slopes and some reproduction was noted.

Klimstra, W. D. (S. Ill. U., Carbondale.) THE POTENTIAL OF WILDLIFE MANAGEMENT ON STRIP-MINED AREAS. Presented at Aug. 1958 meeting of A.I.B.S., Ecol. Soc. Am. Section in symposium: The Ecology and Reclamation of Strip-mined Areas. 16 p., mimeo. Aug. 1958.

A review of studies made of stripped lands in s. Ill., and a discussion of what can be done with such areas by way of habitat management and recreational development. Stripped areas have considerable fish and wildlife potential, but the manager is limited by ecological circumstance and financial feasibility.

## CONTROL OF UPLAND VEGETATION WITH HERBICIDES ETC.

Anon. RIGHTS-OF-WAY PROGRESS REPORT. Conn. Wildl. Cons. Bul. 4(5): 4, 7, 1 photo. Sept.-Oct. 1958.

The Conn. Light & Power Co. is creating much good wildlife habitat. Along its power-line cuts, it keeps down unwanted vegetation by selective spraying of herbicides. A representative of the State Bd. of Fisheries & Game works closely with the company throughout the operation. Crews are taught what shrubs and other plants should be retained for wildlife purposes. Brushy edges next to the woods become extremely valuable to wildlife. Berry and nut-bearing shrubs and small flowering trees such as dogwood and hawthorne are preserved insofar as feasible. Cut brush is piled along the edges of the woods and provides wildlife cover.

Bramble, W. C., and W. R. Byrnes. (Pa. State U., U. Park.) USE OF A POWER-LINE RIGHT-OF-WAY BY GAME AFTER CHEMICAL BRUSH CONTROL. Pa. Game News 29(9): 19-25, 4 photos. Sept. 1958.

Sections of a right-of-way were treated in 1953-54. Broadcast, semi-basal, and basal spraying were tried in different ways and one section was cut. Broadcast spraying with Ammate resulted in 90% bare ground. Fireweed, which is of slight wildlife value, dominated this ground the first year but gradually dwindled in later years; sweetfern, a shrub of some browse value to deer, increased later. All broadcast sprays killed such low shrubs as blueberry. Basal sprays caused little disturbance of shrubs and herbs; plant cover remained on 75% of area. All sprayed areas are gradually reverting to bracken-sedge-herb-blueberry type. No soil erosion occurred, for litter was not disturbed. Wildlife usage was studied by transect counts of scats and observation of sign. Results are tabulated. All areas were used by game animals. Deer apparently preferred unsprayed and winter basal areas. Rabbits may have preferred unsprayed, winter basal, and hormone-broadcast areas. The few turkey signs suggested preference for areas broadcast with hormone mixture or Ammate. Deer use of all areas increased over the 5-year period, but was less where brush was reduced. In spring and early summer, however, deer fed heavily on young shoots of herbs. Young turkeys used the grass-herb cover of broadcast areas for catching insects. Squirrels apparently "planted" acorns in the right-of-way--a practice that will complicate maintenance. Rabbits actually increased in treated areas, owing to more low food and cover and more woodchuck holes. In general, treatments benefited wildlife by creating more interspersion and edge. Broadcast spraying benefits some game animals and its results can be maintained by selective basal spraying. Initial basal spraying creates a tight cover that is relatively cheap to maintain and is highly satisfactory both to the utility company and to wildlife. Table lists major plants of right-of-way as of high or low seasonal value to deer, grouse, turkey, and rabbit.

Helgeson, Earl A. (N. Dak. Agr. Exp. Sta., Fargo.) METHODS OF WEED CONTROL. Food & Agr. Org. of U. N., Rome, FAO Agr. Studies no. 36. x + 189 p., 32 figs. 1957. $2.00 or 10s., paper. Available in U. S. from Columbia U. Press, Internatl. Doc. Serv., 2960 Broadway, N. Y. 27, N. Y.

A useful handbook intended for world use but apparently most applicable in N. Am. Chapters treat: principles of weed control; cultural and mechanical methods; a wide variety of herbicides; equipment; control of aquatic and ditch-bank weeds (p. 78-84); control of woody plants (p. 85-94); control in grasslands, field crops, and horticultural crops; and control of 41 specific weeds. Appendices tabulate the general reactions of hundreds of kinds of plants to 5 herbicides, present definitions and chemical names, and provide conversion factors. For aquatic weeds, the chief herbicides recommended are benoclor, 2,4-D, solvent naphtha, CMU, and sodium arsenite. Control of aquatic plants may be treated more satisfactorily in US F&WS Cir. 19-Revised. As a general reference on weed control, however, Helgeson's book is a prime source.

Niering, Wm. A. (Conn. Coll., New London.) PRINCIPLES OF SOUND RIGHT-OF-WAY VEGETATION MANAGEMENT. Econ. Bot. 12(2): 140-144. Apr.-June 1958.

Reviews the problem and points out that from all points of view the control of vegetation on right-of-ways should be done selectively and with sound biological advice.

## MAMMALS--GENERAL

Fiedler, Walter. BEOBACHTUNGEN ZUM MARKIERUNGSVERHALTEN EINIGER SÄUGETIERE. Z. Säugetierk. 22(1/2): 57-76, 2 pl. 1957. [From J. Mamm. 39(3).]

Lyman, Charles P., and others. THE EFFECTS OF HIBERNATION ON THE REPLACEMENT OF BLOOD IN THE GOLDEN HAMSTER. J. Exp. Zool. 136(3): 471-485, 2 graphs. Dec. 1957.

Tsurikov, Alexander N. EINE METHODE SUM MESSEN DER KOPF-, RUMPF- UND SCHWANZLÄNGE BEI LEBENDEN ALBINO-MÄUSEN. Säugetierk. Mitt. 5(2): 72-74. April 1957. [From J. Mamm. 39(3).]

## MAMMALS--FAUNAS AND MANUALS

van den Brink, F. H. THE MAMMALS OF EUROPE WEST OF 30° LONGITUDE. Paul Parey, Hamburg & Berlin. 225 p., 470 illus. of which 163 are colored. 1956. 19.80 D.M. [From German review by Muller-Using in Z. Jagdwissensch. 3(2).]

In German. This handbook on Eur. mammals is the 2d in the series of which Peterson, Mountfort, and Hollom's, The birds of Europe, was the first. Europe's 187 mammals are all described and illustrated. For each species is included such information as identification, tooth characters, tracks, time of rut, gestation period, season of birth, litter size, and life span. There is a series of plates of representative skulls of each order. Chapters are included on mammalian speciation, mammalian research and conservation, and growth of horns and antlers.--V. F. Flyger.

## MAMMALS--POPULATIONS, HOME RANGES, COMMUNITIES

Beer, James R., Louis D. Frenzel, and Charles F. MacLeod. (U. Minn., St. Paul.) SEX RATIOS OF SOME MINNESOTA RODENTS. Am. Midl. Nat. 59(2): 518-524. Apr. 1958.

Summary: "A total of 5772 small mammals from two areas in Minnesota were trapped and the populations analyzed to determine the sex ratios in these species. It was found that the female deer mouse was more susceptible to trapping than the male while there appeared to be no difference between the sexes in the meadow vole and red-backed vole when trapped on the small islands. Since the males are more active than the females there are two possible interpretations of the increase in the proportion of males with time in the mainland populations. The first is that the females are more vulnerable than the males and the second that there is a higher rate of ingress from outside areas in the males. The male jumping mouse appears to be more vulnerable to trapping than the female. The observed sex ratios and, presumably, the actual sex ratios change with the age of the group. Males appear to be more vulnerable to predation and accidents than the females. Although there was a shift in sex ratio from year to year there appeared to be little relationship with the population density. There was some seasonal shift of sex ratio with the largest proportion of the males being found in the late summer and fall and the lowest in the spring."

Drake, James J. THE BRUSH MOUSE PEROMYSCUS BOYLII IN SOUTHERN DURANGO. Mich. State U. (E. Lansing), Publ. of Mus., Biol. Ser. 1(3): 97-132, 3 pl., 8 figs. July 1958. Available on exchange or request to Museum.

Moving lines of live traps were used in the head of a small, rocky, wooded canyon for 9 days, snap traps for 3 days. Various methods of estimating the population were tried. Population of P. boylii was about 9 to 14 per acre [lower figure probably more accurate than the higher]. Biomass was about 240 g. of P. boylii per acre. About 1.25 ♂♂ per ♀ were caught. Av. maximum movement was

43.1 yards for ♂♂ and 31.7 yards for ♀♀. Home range areas were estimated as being 0.08 to 0.16 (av. 0.142) acres for ♂♂, and 0.06 to 0.16 (av. 0.110) for ♀♀. [Home range estimates probably are minimal.] Of 33 individuals marked, 27% (77% of them ♂♂) were considered transients. None of the ♀♀ was in breeding condition (July). Trapping data indicate that P. boylii prefers sloping, rocky habitat. The paper gives a good description of the canyon and lists of animals and plants present.

Gier, H. T., and G. V. R. Bradshaw. (Agr. Exp. Sta., Manhattan, Kans.) FIVE-YEAR REPORT ON THE KANSAS SMALL MAMMAL CENSUS. Trans. Kans. Acad. Sci. 60(3): 259-272. Oct. 1957. [From J. Mamm. 39(3).]

Larthe, Yvonne. (Ministry Agr., Tolworth, Surrey, Eng.) DYES SUITABLE FOR USE IN STUDIES OF RAT MOVEMENTS. J. Mamm. 39(3): 450-451. Aug. 1958.

Thirty dyes were tested for ability to color scats and for good acceptance by rats. Whole wheat was the bait base and 5% glycerine was added to make dyes adhere to bait. Glycerine seemed to add to attractiveness of baits. Twenty-four dyes did not stain scats conspicuously. Six stained well, but 3 of these may have been a bit repellent. The other 3 were of similar hue and clearly palatable. A 4th good dye was known in advance. "It may be inferred from these tests that in addition to Chlorazol Sky Blue FF200, it would be safe to use Erythrosine 108678 at 0.05 per cent, Acid Green EC at 0.5 per cent and Brilliant Blue FCF [gave green scats] at 0.05 per cent, all with glycerine as an adhesive, for movement studies where good bait acceptance is desirable."

New, John G. (State Teach. Coll., Oneonta, N. Y.) DYES FOR STUDYING THE MOVEMENTS OF SMALL MAMMALS. J. Mamm. 39(3): 416-429. Aug. 1958.

Summary: "A 50-foot grid was established in a field and in a woodlot. Half of a wax-coated quart milk container was baited with rolled oats and placed at each station. The boxes served to protect the bait and as receptables for feces. Visitation, as evidenced by deposition of scats (feces), was recorded by species. The introduction of dyed bait at certain stations enabled the author to record distances moved from the station with dyed bait, when colored scats were recovered at various stations in the grid. From a frequency distribution of distances moved, it was demonstrated that the short-tailed shrew, Blarina brevicauda, ranged shorter distances in the woodlot than in the field. Similar studies with Microtus pennsylvanicus and Peromyscus leucopus were conducted. Deermice ranged greater distances than either shrews or meadow mice and only 8 per cent of the dyed scats for this animal were recovered at the dyed-bait station. The same figures for the other species are: Microtus, 22; Blarina. field--26, woods--50. Areal and linear estimates based on modified averages of distances moved, compare favorably with home range data from the literature. A list of dyes suitable for each of the species studied is presented with suggested alternates."

Sealander, J. A., D. N. Griffin, J. J. DeCosta, and D. B. Jester. (U. Ark., Fayetteville.) A TECHNIQUE FOR STUDYING BEHAVIORAL RESPONSES OF SMALL MAMMALS TO TRAPS. Ecology 39(3): 541-542. July 1958.

Sheets of smoked paper were placed under traps of 4 kinds. This was done in deserted outbuildings, but could be done in any dry, sheltered situation, or covers could be put over the sheets and traps. House mice were the animals studied. They approached traps cautiously, as shown by paw-prints on smoked paper, investigated the traps, and often did not enter. It should not be assumed that all individuals of a population are equally susceptible to capture and re-capture. In the present study, 5 nights of trapping, at weekly intervals, resulted in only 1 recapture. Large Sherman live traps were more effective than 3 kinds of snap traps (Museum Special, rat, and mouse), but Museum Specials were nearly as effective.

Spencer, Donald A., compiler. BIOLOGICAL ASPECTS OF THE 1957-58 MEADOW MOUSE IRRUPTION IN THE PACIFIC NORTHWEST. US F&WS, Wildl. Res. Lab., Denver 2, Colo. 9 p. [1958.]

Populations of Microtus montanus may have ranged up to 3,000 per acre, but generally were far lower at the outbreak's peak. Worst of the outbreak was in 5 irrigated valleys. Starting in the winter of 1956-57, microtines became abundant from Colo. to the Pacific Coast. In 1957 they spread into many habitats,

favored by exceptionally lush vegetation. Cultivation forced voles of agricultural areas to concentrate in restricted areas, thus making local situations acute. Severe damage was done to crops and earthen structures by Dec. 1958. Natural areas also had high populations and suffered damage to browse plants. Studies in Jan. 1958 revealed populations estimated to be as high as 800 per acre and as many as 28,000 holes in the ground per acre. Fall litters typically remain immature, and in groups, for 4-6 months. In Jan. 1958 such groups av. 3.3 per nest. By Mar. the av. had dropped to 2 per nest. Examples are given of large populations that dwindled during winter. The usual over-winter mortality is about 50%. Peak populations usually break sharply in late spring. But the populations discussed here suffered at least 90% mortality by April. Populations nearing a crash usually have a predominance of ♀♀, but the populations under consideration kept sex ratios close to 1:1. Few pregnant voles were found in winter of 1957-58, except in 1 area. As breeding increased in spring and summer, reproduction varied widely from place to place, indicating that no outbreak in 1958-59 was to be expected. Excessive numbers of voles usually are the result of 1 season's multiplication and usually are followed by several years of relative scarcity. Local populations may remain high into 2d year, but this phenomenon is not widespread.

van Wijngaarden, A. THE RISE AND DISAPPEARANCE OF CONTINENTAL VOLE PLAGUE ZONES IN THE NETHERLANDS. Verslagen Landbouwkundige Onderzoekingen, Plant Protection Service, Wageningen, no. 63.15. 21 p., map. 1957. [From J. Mamm. 39(3).]

## SHREWS, MOLES, BATS

Emmons, Chester W. (Natl. Inst. Allergy & Infect. Dis., Bethesda, Md.) ASSOCIATION OF BATS WITH HISTOPLASMOSIS. Pub. Health Rep. 73(7): 590-595, 1 photo. July 1958.

An epidemic of histoplasmosis occurred in a family living in an old house near Clarksburg, Md. The house was infested with Eptesicus fuscus. Bat guano was found in and around the house. Soil samples around the house were positive for Histoplasma, but 16 bats were negative for the organism. Author believes that the guano deposited on the soil provided suitable conditions for saprophytic growth of Histoplasma. Such circumstances may provide the explanation for puzzling outbreaks of histoplasmosis in which no association with chicken droppings (the usual source) can be found. Review of literature suggests that people have been infected with Histoplasma in bat caves.

Glass, Bryan P. (Okla. State U., Stillwater.) RETURNS OF MEXICAN FREETAIL BATS BANDED IN OKLAHOMA. J. Mamm. 39(3): 435-437, 1 map. Aug. 1958.

"These data indicate that the cave-dwelling population of T. brasiliensis mexicana of Texas and Oklahoma executes a southward migration over a period of some two months during the late fall to some undetermined destination south of the Edwards Plateau."

Griffin, Donald R. (Harvard U.) LISTENING IN THE DARK: THE ACOUSTIC ORIENTATION OF BATS AND MEN. Yale U. Press, New Haven, Conn. 413 p., illus. 1958. $7.50. [From Sci. News Letter 73(23).]

"Reporting a study of the way bats navigate by emitting ultrasonic sounds and being guided by their echoes, and the practical use we make of the same principle."

Guilday, John E. (Carnegie Mus., Pittsburgh 13, Pa.) INDIVIDUAL AND GEOGRAPHIC VARIATION IN BLARINA BREVICAUDA FROM PENNSYLVANIA. Annals Carnegie Mus. 35(5): 41-68, 14 figs. Dec. 1957.

Summary: "This article presents a method of arriving at the relative age of specimens of Blarina brevicauda based upon cranial suture closure. Males averaged significantly greater than females in total length, length of hind foot, weight, total length of skull and occipital height in a sample of 121 specimens from northwestern Pennsylvania. Age differences in the samples studied were slight. All immature shrews collected were of essentially adult size. However, significant differences between younger and older specimens were found

in weight, total length of skull, cranial height, maxillary breadth, and width of foramen magnum. External measurements were found to be significantly influenced by personal bias. A west-east cline is demonstrated for Blarina brevicauda in Pennsylvania, shrew crania becoming smaller and less rugged towards the east. It is suggested that this demonstrates intergradation with the smaller Atlantic Coast form, Blarina brevicauda carolinensis. The most recent taxonomic work on the northern races of Blarina brevicauda appears to be at variance with the results reported herein, as far as Pennsylvania is concerned, and thus suggests the need for future study."

Orr, Robert T. (Calif. Acad. Sci., San Francisco.) KEEPING BATS IN CAPTIVITY. J. Mamm. 39(3): 339-344. Aug. 1958.
Capture, general care, control of mites, problem of excess weight, feeding, importance of vitamin supplement, longevity.

## RABBITS AND PIKAS

Boisvenue, Rudolph Joseph. STUDIES ON THE LIFE HISTORY AND ECOLOGY OF CUTEREBRA SPP. OCCURRING IN MICHIGAN COTTONTAILS WITH SYSTEMATIC STUDIES ON CUTEREBRINE LARVAE FROM OTHER MAMMALS. Ph.D. thesis, Mich. State U. 218 p. 1955. [From long abstract in Dissertation Abstracts 19(1).]
Cuterebra horripilum was predominant in cottontails, but C. buccata occurred also. Primary infection site was the neck, but larvae occurred also on scrota, cheeks, back, and shoulders. In 1 cottontail, the third-stage larva apparently migrated under the skin. The third larval stage lasted an average of 15 days; the airhole diameters of the larvae reflected their developmental phases. Mature larvae that had dropped from their hosts could live 9-13 days before pupating. In sandy areas, larvae burrowed 1-1/2 to 2 in. to pupate. Adult flies lived 1-5 days. There was only 1 generation per year. First-stage larvae showed a peak of occurrence in early July, third-stage larvae in early August. Larvae showed peak occurrence on juvenile rabbits Aug. 1-20, on adults July 20-30. More juvenile than adult rabbits had Cuterebra larvae. The number of warbles per infected rabbit was greatest when the number of infected rabbits was highest. Higher numbers of infections were found in areas of sandy soils; these areas also had greater numbers of rabbit burrows. Adult flies occurred in areas of dense sumac bushes, willow swales, and clover fields. Cuterebra larvae were collected from cats, dogs, jackrabbits and white-footed mice. An unidentified sp. was found on Nevada jackrabbits. A key is provided for the identification of larval instars of C. buccata, C. fontinella, and C. horripilum. A check-list of Cuterebra spp. of w. hemisphere records geographic locations and hosts.

Bull, P. C. (D.S.I.R., Wellington, N. Z.) INCIDENCE OF COCCIDIA (SPOROZOA) IN WILD RABBITS, ORYCTOLAGUS CUNICULUS (L.), IN HAWKES'S BAY, NEW ZEALAND. N. Z. J. Sci. 1(2): 289-329, 11 figs. June 1958.
Long, detailed, research report. "It is suggested that the age-linked differences in the infection rate of E. stiedae are due mainly to acquired resistance, the locality-linked ones to environmental factors affecting the age-structure of the host population, and the long-term differences to variations in the density and age-structure of the host population. Variations in the infection rate of E. stiedae in relation to host age show that this parasite is well suited as a controlling factor of rabbit populations, but there are occasions when no control is exerted because of a very low infection rate."

Fenner, Frank, W. E. Poole. I. D. Marshall, and A. L. Dyce. (Sch. Med. Res., Australian Natl. U., Canberra.) STUDIES IN THE EPIDEMIOLOGY OF INFECTIOUS MYXOMATOSIS OF RABBITS. VI. THE EXPERIMENTAL INTRODUCTION OF THE EUROPEAN STRAIN OF MYXOMA VIRUS INTO AUSTRALIAN WILD RABBIT POPULATIONS. J. Hygiene 55 (2): 192-206, 2 figs., 1 pl. June 1957.

Geis, Aelred Dean. A POPULATION STUDY OF THE COTTONTAIL RABBIT IN SOUTHERN MICHIGAN. Ph.D. thesis, Mich. State U. 208 p. 1956. [From long abstract in Dissertation Abstracts 19(1).]
An evaluation of census methods showed that the Lincoln Index method was reliable if the rabbits that were trapped and marked were sampled the second time by some other method, as by shooting. If the tails of trapped rabbits were

dyed yellow, satisfactory population estimates could be made from data on rabbits observed in the field. Several indexes of rabbit abundance were tested. It was found that either the total hunting kill or the kill made during a constant effort gave reliable indexes. When hunting effort varied from year to year, the rate of kill based on the total kill and effort was unreliable. Trapping data gave a rough index of abundance in one study area, but not in the other. Age ratios in the fall were reliable indexes only during the few years when spring population levels were constant. Population levels, mortality, and effects of hunting were studied on Kellogg Bird Sanctuary and Farm and on Kellogg Forest. "On both study areas, autumn juvenile:adult ratios were inversely proportional to spring adult population levels." At the Sanctuary, size of spring population depended on hunting kill, but at the Forest hunting took a fairly constant proportion and the spring population apparently depended on the level of the previous fall. No marked changes in productivity occurred between 1932 and 1955 at the Sanctuary or between 1940 and 1955 at the Forest, despite changes in habitat. Population increase from spring to fall varied widely. Adult mortality up to 60% occurred during the warm season. The paper includes data on hunting kill, crippling loss, age composition, and food preferences in relation to availability. It also gives an analysis of hunting pressure and the factors influencing it.

Gooding, C. D., and J. L. Long. (Agr. Protection Bd., Perth, W. Australia.) SOME FLUCTUATIONS WITHIN RABBIT POPULATIONS IN WESTERN AUSTRALIA. J. Australian Inst. Agr. Sci. 23(4): 334-337, illus. 1957. [From Biol. Abs. 32(7).]

Despite certain limitations in the ferreting method for obtaining data on rabbit number and sex ratio, including young, the breeding season is apparently initiated by rains themselves, rather than by increase in available food, which occurs later.--M. S. Brown.

Hayne, Don W., and H. A. Cardinell. (Inst. Fish. Res., Ann Arbor, Mich.) NEW MATERIALS AS COTTONTAIL REPELLENTS. Quart. Bul., Mich. Agr. Exp. Sta. 41 (1): 88-98, 2 photos. Aug. 1958.

Summary: "The list of materials tested as repellents against the cottontail rabbit in Michigan has been expanded somewhat and several effective new materials are listed. Of particular promise are certain water-dispersible materials, including thiram and z.i.p., each of which is mixed with asphalt emulsion, and the experimental material TN2500. Aluminum foil seems useful. Certain differences were observed in comparing the results of this study with that of Hildreth and Brown [USDA Tech. Bul. 1134] carried out in Wyoming principally against jack rabbits. It is concluded that repellents should be tested against the kind of rabbit for which their use is recommended."

Howard, Walter E. (U. Calif., Davis.) THE RABBIT PROBLEM IN NEW ZEALAND. N. Z. Dept. Sci. & Indus. Res., Inf. Ser. no. 16. 1-47 p., 31 photos. 1958. 4s.

Interesting, well-illustrated, semipopular report that gives much information on life history, habitat relationships, and control of European rabbit in N. Z. An appendix gives 6 formulae for poison baits. Summary: "New Zealand is now much less attractive to rabbits than it was in former years. Rabbits do not thrive in tall grass; they require bare ground or turf conditions before becoming so numerous as to be an economic problem. Seeding, topdressing, rotational grazing, and partial spelling do not favour rabbits, and they serve as a plant barrier or a form of biological control. The rabbit would appear to have evolved in such a way that it can quickly take advantage of and improve suitable habitat conditions when they become available, but cannot create an environment of its own liking. Without some other assistance, rabbits cannot convert tall grass or dense tussock to bare soil or to turf conditions throughout the year. Methods of rabbit control in New Zealand are well organized. The rabbit has been decommercialised completely and professionally trained men do most of the actual work of control. Possible means of improvement are few, but the following points deserve further consideration: (1) Bridging the gap between fundamental and applied research. (2) The need for more extension work by rabbit boards and of more liaison between them. (3) The desirability of developing a means of poisoning that can be done without requiring free-feeding and the removal of stock from the area. (4) Further testing of grain baits, especially a mixture of different kinds of grain. (5) The need for developing a suitable persistent bait."

Klimstra, W. D., and E. L. Corder. (S. Ill. U., Carbondale.) FOOD OF THE COTTONTAIL IN SOUTHERN ILLINOIS. Trans. Ill. State Acad. Sci. 50: 247-256, 4 figs. 1957.

Cottontail foods were studied on 2 areas during 1952. Chief method was microscopic analysis of 290 droppings, but cuttings were observed in field. Results are graphed, tabulated, and discussed. Chief foods were Kentucky Bluegrass, Soybean, Horse Nettle (Solanum), Wheat, Canada Bluegrass, Blackberry, Dewberry, Corn, Lespedeza, and Apple. Almost all of the food was herbaceous. Grasses were utilized extensively at all seasons. Agricultural crops were major portions of diet throughout year. Availability was important, but certain foods were more acceptable at some seasons than others. "It was apparent, then, that cottontails of southern Illinois had definite food preferences, that these preferences were closely associated with availability, and that within poorly defined limits fallow and idle land were possibly as acceptable as agricultural lands in the provision of suitable foods."

Meldrum, G. K., J. T. Bignell, and Ian Rowley. (Dept. Agr., Hobart, Tasmania.) THE USE OF SODIUM FLUOROACETATE (COMPOUND 1080) FOR THE CONTROL OF THE RABBIT IN TASMANIA. Australian Vet. J. 33(8): 186-196, 1 graph. Aug. 1957.

Good description of effects of 1080 on animals, and discussion of field experience with 1080 in controlling rabbits. The authors point out that fluoracetamide, a chemical related to 1080, is slower acting and for that reason may be better than 1080.

Myers, K. (Wildl. Surv. Sec., C.S.I.R.O., Field Sta., Albury, N.S.W.) FURTHER OBSERVATIONS ON THE USE OF FIELD EXCLOSURES FOR THE STUDY OF THE WILD RABBIT, ORYCTOLAGUS CUNICULUS (L.). C.S.I.R.O. Wildl. Res. 3(1): 40-49, 1 fig., 1 pl. July 1958.

Summary: "Populations of wild rabbits...can be managed experimentally in 2-acre enclosures, providing the pregnant females are allowed to dig a short burrow in which the young are born. Nestlings should not be handled within a day of birth, since this usually leads to desertion by the parent. A method of finding and examining the nesting chamber is described. Drowning causes large mortalities amongst nestlings, on flat sites, after steady rain. Predators can also cause large mortalities among the young rabbits unless special precautions are taken to keep them out. Biological data collected during the experiment show that nestling rabbits increase in weight from about 36 g when 1 day old at an approximate rate of 7.4 g/day so that they weigh about 185 g when they emerge from the burrow at the age of 21 days. Other data suggest that where dry conditions cause the cessation of reproductive activity all unweaned members of the population die, and the growth rates of recently weaned rabbits are markedly retarded. General problems of technique are discussed."

Mykytowycz, R. (Wildl. Surv. Sec., C.S.I.R.O., Canberra.) CONTACT TRANSMISSION OF INFECTIOUS MYXOMATOSIS OF THE RABBIT, ORYCTOLAGUS CUNICULUS (L.). C.S.I.R.O. Wildl. Res. 3(1): 1-6, 1 fig. July 1958.

Summary: "...The louse Haemodipsus ventricosus (Denny) and the mite Cheyletiella parasitivorax (Megnin) were shown to be capable of transmitting the disease, though their efficiency as vectors must be considered of a low order. It was also shown that the disease could be transmitted by prolonged flank-to-flank contact between sick and healthy rabbits, by contamination of the pads of the forefeet with the virus, and by sexual activity. Field observations suggest that two parasitic mites, Bdellonyssus bacoti Hirst and Schöngastia antipodianum (Hirst), might play a vector role in the field."

Mykytowycz, R. (Wildl. Surv. Sec., C.S.I.R.O., Canberra.) SOCIAL BEHAVIOUR OF AN EXPERIMENTAL COLONY OF WILD RABBITS, ORYCTOLAGUS CUNICULUS (L.). I. ESTABLISHMENT OF THE COLONY. C.S.I.R.O. Wildl. Res. 3(1): 7-25, 7 figs. July 1958.

From summary: A small colony of rabbits, all marked, was studied in a 1.75-acre pen at all hours. A rigid order of rank was maintained. Bucks dominated bucks, does dominated does. The highest buck controlled the group; he was aggressively alert and had a greater range of movement than the others. The order of rank was maintained by chasing and retreat; fights were rare. Newly introduced rabbits were treated hostilely and were attacked by dominants. Removal of dominant buck caused much disturbance among ♂♂, but 2d ranking ♂

always won. If original leader was returned, there was long, vicious fighting; the loser was degraded to lowest rank. This was not true of ??. The 2 warrens in the pen became the recognized territory of the dominant pair; most other rabbits were vigorously excluded. Subordinate rabbits restricted their activities to certain areas, but did not prevent other rabbits from invading them.

Mykytowycz, R., and Ian Rowley. (Wildl. Surv. Sec., C.S.I.R.O., Canberra.) CONTINUOUS OBSERVATIONS OF THE ACTIVITY OF THE WILD RABBIT, ORYCTOLAGUS CUNICULUS (L.), DURING 24-HOUR PERIODS. C.S.I.R.O. Wildl. Res. 3(1): 26-31, 1 graph. July 1958.

Summary: "Continuous observations during three separate 24-hour periods were carried out in late spring on a population of individually marked wild rabbits... established in an artificially illuminated enclosure. Rabbits were observed to feed throughout the night, with a peak at 2100 hr. Sexual behaviour during post-partum oestrus, and copulation between a buck and a virgin doe, are described. An account of the daily activities of individual rabbits is given; and the bearing of the observed pattern of activity on the reliability of sight counts for the estimation of rabbit populations is discussed." The maximum percentage of rabbits above ground at the same time was 66. A count at dusk recorded only 42% of population.

Rowley, Ian. (Wildl. Surv. Sec., C.S.I.R.O., Canberra.) BEHAVIOUR OF A NATURAL RABBIT POPULATION POISONED WITH "1080". C.S.I.R.O. Wildl. Res. 3(1): 32-39, 3 figs., 1 pl. July 1958.

Summary: "...Observations were made from a hide for a total period of 72 hours spread over 13 days. Preliminary feeding with unpoisoned bait appeared to change both the pattern and timing of the rabbits' activities and to increase progressively their confidence toward both bait and furrow. A satisfactory kill was obtained despite the presence of lush pasture. The composition of the surviving group is discussed and means of improving efficiency of poisoning suggested."

Sheffer, Dale E. (R.F.D. 3, Gettysburg, Pa.) COTTONTAIL RABBIT PROPAGATION IN SMALL BREEDING PENS. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 209-212. 1956 (1957).

For similar and related papers by author see WR 85 p. 24, 86 p. 36, 88 p. 36, 89 p. 28-29, 92 p. 48-49.

## RODENTS--MISCELLANEOUS

Dodge, Wendell E. INVESTIGATIONS CONCERNING THE REPELLENCY AND TOXICITY OF VARIOUS COMPOUNDS FOR CONTROL OF PORCUPINE (ERETHIZON D. DORSATUM). M. S. thesis, U. Mass. v + 50 p., 11 photos, 7 figs. Jan. 1958.

Porcupines were obtained by ingenious methods of capture after trapping proved unsuitable. The animals had several diseases and parasites; methods of doctoring for these are listed. Techniques of testing candidate repellents and poisons are described. Porcupines are not easily repelled. The best repellent tested was beta nitrostyrene. It is good for protecting wooden structures; its phytotoxicity was not ascertained. It has an irritating odor and irritates skin. The best poison tried was sodium arsenite. It gave 95% control in a field test. Still badly needed is a good attractive bait that will last well and be accepted at all seasons. "For absolute control in large areas, trapping and shooting can be effective. One person, well trained in the habits of porcupine, could in a single nights work nearly decimate a denning concentration. With proper planning and prior reconnaissance a positive control could be effected."

Eskridge, Paul S. (Colo. State U., Ft. Collins.) ROLE PLAYED BY DIETARY FAT IN PEROMYSCUS EXPOSED TO LOW TEMPERATURES. Ecology 39(3): 554-556. July 1958.

When wild adult P. maniculatus in individual cages without nesting material were given a complete diet containing only 10% of the calories as fat, mice could not live. They did live on a similar diet containing 35% of calories as fat. Similar mice caged together with nesting material were offered both low and high fat diets and were exposed to 2 consecutive treatments: 1. Kept in room with temperature of 85°F. 2. Kept outdoors at temperatures ranging from -21.8° to 66° and av. 25.3°F. Outdoors, mice ate significantly more of the high-fat diet and less of the low-fat diet.

Foster, Dorothy Anne Dice. A COMPARISON OF THE PRAIRIE AND FOREST RACES OF THE DEERMOUSE, PEROMYSCUS MANICULATUS, WITH RESPECT TO CERTAIN MEASURES OF BEHAVIOR AND TEMPERAMENT. Ph.D. thesis, U. Mich. 109 p. 1957. [From long abstract in Dissertation Abstracts 18(6).]

Miller, Milton A. (U. Calif., Davis.) BURROWS OF THE SACRAMENTO VALLEY POCKET GOPHER IN FLOOD-IRRIGATED ALFALFA FIELDS. Hilgardia 26(8): 431-452. 1957. [From Biol. Abs. 32(8).]

Patterns, dimensions and other characteristics of burrows dug in irrigated alfalfa fields by Thomomys bottae navus were determined by excavation and scale-mapping of 9 burrow systems. Tunnel footage ranged between 31 and 275 ft. with a mean of 107 ± 21 ft. and an av. diameter of 2.6 ± 0.08 in. giving a volume of 3.87 ± 2.8 cu. ft. Recently plugged tunnels av. 8.6 ± 2.8 ft. A typical burrow comprises 2 unequal parts: (1) a larger superficial network of main and lateral feeding tunnels lying within a foot of the surface (modal depth at 6 to 8 in.) and connecting with (2) a smaller deeper system of tunnels, 1-4 nests and an occasional food cache centering at a depth of 20 to 22 in. Additionally, burrows generally have 1 or more steep tunnels that end blindly at various depths up to 7 ft. and probably serve for limited drainage. Burrows tend to be concentrated in or near field levees. Study of mound production in 8 other systems during 2- to 4-week periods after irrigation showed that fresh mounds reappear on about the 2d day after flooding, rapidly reach peak production during the latter half of the 1st week, and then decline as the ground becomes dry. During this period, the daily soil turnover was 5.13 ± 0.71 lb. (dry weight) per gopher. Burrowing is associated with soil moisture, the optimum ranging between 15 and 17% with markedly less digging under wetter or drier conditions. Suggestions for improvement of gopher control are derived from this study.--M. A. Miller.

Miller, Richard S. (Colo. State U., Fort Collins.) RATE OF INCISOR GROWTH IN THE MOUNTAIN POCKET GOPHER. J. Mamm. 39(3): 380-385, 1 graph. Aug. 1958.

Summary: "The rates of extrusive incisor growth were studied in pocket gophers [T. talpoides] from two different habitats. Although the average rates for the two populations were significantly different, there is a direct correlation between body weight and rate of incisor growth and the rates for individuals from both populations were found to follow the same regressions. The differential rate between upper and lower incisor growth is also correlated with body weight, so that changes in rate of growth are more pronounced in the lower than in the upper incisors. Although extrusive incisor growth is an adaptation to incisor use and attrition, and although the rate of growth is probably adapted to general species requirements, it does not appear to be a direct adaptation to local habitat conditions. In view of the fact that small gophers, which occur in coarser and more compact soils, have a lower rate of extrusive growth than large gophers, it would seem that the rate of extrusive growth is so high in pocket gophers that a wide range of individual variation can be expressed without seriously affecting the value of this adaptation."

Payne, D. D., and D. C. O'Meara. (U. Maine, Orono.) SARCOPTES SCABEI INFESTATION OF A PORCUPINE. J. Wildl. Mgt. 22(3): 321-322, 2 figs. July 1958.

Sarcoptes scabei was isolated from a Porcupine (Erethizon dorsatum) exhibiting encrustations around the mouth, on the legs, and over most of the ventral surface. The encrusted material was cleared with a 10% solution of sodium hydroxide to expose the mites.

Redman, John P., and John A. Sealander. (Texarkana Junior Coll., Texas.) HOME RANGES OF DEER MICE IN SOUTHERN ARKANSAS. J. Mamm. 39(3): 390-395. Aug. 1958.

Peromyscus were studied by live-trapping in an immature oak-pine forest near Pine Bluff, Ark. Traps were set on 1-acre and 4-acre plots. Home ranges were estimated (by the inclusive boundary-strip method) from records of mice trapped 3-8 times. Apparent range size for 5 P. nuttalli was 0.11-0.14 acre; for 13 P. leucopus, 0.07-0.46 acre; for 4 P. maniculatus, 0.04-0.20 acre.--L. F. Stickel.

Romanov, G. V. THE INFLUENCE OF THE FLOOD ON SMALL MURIDAE-RODENTS IN THE VOLGA-DELTA. Zool. Zh. 36(12): 1874-1881. 1957. [From J. Mamm. 39(3).]

In Russian with English summary.

Scheffer, Victor B. (US F&WS, Sand Pt. Nav. Air Sta., Seattle 15, Wash.) DO FOSSORIAL RODENTS ORIGINATE MIMA-TYPE MICRORELIEF? Am. Midl. Nat. 59(2): 505-510, 2 photos. Apr. 1958.

Summary: "Studies on the semiarid lands of the Central Rockies and Plains of the United States and on the altiplano of Peru lead to the conclusion that series of low pimple mounds may be formed on thin or poorly drained soils by other fossorial rodents as well as gophers. Where several fossorial rodents occupy the same site, or have recently occupied the same site, it is often difficult to ascribe the territorial pattern of soil pimples to one rodent agency or another. Under all circumstances, the ordinary influences of gravity, wind, water, ice, and vegetation are constantly at work, tending to alter the ideal circular shape of the mounds. Search should be made for Mima-type microrelief in parts of the world other than western United States."

Stein, Georg H. W. MATERIALIEN ZUR KENNTNIS DER FELDMAUS MICROTUS ARVALIS P. Z. Säugetierk. 22(3/4): 117-135. 1957. [From J. Mamm. 39(3).]

Tamsitt, James Ray. GENETIC, SOCIAL AND ECOLOGICAL ISOLATING MECHANISMS IN THE PEROMYSCUS TRUEI SPECIES GROUP OF MICE. Ph.D. thesis, U. Texas. 180 p. 1958. [From long abstract in Dissertation Abstracts 18(6).]

P. truei, nasutus, and comanche are closely related but appear to be full species. Hybrid offspring are only partially fertile. No natural hybrids are known. Study of morphology, social behavior, chromosomes, and spermatogenesis suggests that social and ecological factors serve to keep the species distinct. The chief social factor is that mice tend to mate only with other mice with which they are familiar, whether of the same or another species. In the wild, this ordinarily would mean mating with a mouse of the same species.

Tanaka, Ryo, Hiroshi Sugiyama, and Seiyu Teramura. (Kochi Women's U., Kochi, Japan.) A CLUMPED DISTRIBUTION OF TROMBICULID MITES VIEWED FROM THE TRUE HOME RANGE OF HOST VOLES. Japanese J. Sanitary Zool. 9(1): 28-32, 1 fig. 1958.

In English. Microtus montebelli were trapped and released on a 1.7-acre plot of grass and scrub surrounded by bare fields. The plot was irregularly U-shaped so that parts were separated; vegetation appeared uniform. Mite-index was a visual count on live voles, which was later checked for consistency by laboratory examinations. Mite-density on voles was not uniform over the area; instead, distribution was clumped, so that there were significantly fewer mites per vole in some sections than in others. This clumped distribution of mites would be possible only if the voles had limited ranges and individuals did not wander over the entire 1.7-acre plot; recapture records of the voles showed that this was true. Home ranges were believed to be not much more than 0.15 acre.--L. F. Stickel.

Thorne, Oakleigh, II. (Thorne Ecol. Res. Sta., Boulder, Colo.) SHREDDING BEHAVIOR OF THE WHITE-FOOTED MOUSE, PEROMYSCUS MANICULATUS OSGOODI, WITH SPECIAL REFERENCE TO NEST BUILDING, TEMPERATURE, AND LIGHT. Ph.D. thesis, U. Colo. 1958. Published as Thorne Ecol. Res. Sta. Bul. 6: 1-75. Sept. 1958.

Shredding of paper towels by laboratory-confined mice was slight during periods of high temperature, but great at low. Shredding was reduced in bright light compared with darkness at medium temperature. Amount of shredding correlated well with quality of nest building.--Author.

## RATTUS AND MUS

Chew, Robert M. (U. of S. Calif., Los Angeles.) WATER REQUIREMENTS OF MICE: A BASIS FOR CONTROL. Pest Control 26(8): 26, 28, 31, 1 fig. Aug. 1958.

Technical explanation of water balance and water needs in mice. Removal of water sources might not kill off an entire mouse population, but it could limit its food consumption, vigor, reproduction, and growth. Also, shortage of water makes water baits and moist baits more attractive and makes dry baits less attractive.

Prychodko, W. (Inst. Cancer Res., 4811 John R. St., Detroit 1, Mich.) EFFECT OF AGGREGATION OF LABORATORY MICE (MUS MUSCULUS) ON FOOD INTAKE AT DIFFERENT TEMPERATURES. Ecology 39(3): 500-503, 1 fig. July 1958.

"It has been demonstrated that the food consumption per gram of body weight by laboratory mice kept in bare cages varies inversely with the number of animals in the group. As the ambient temperature is lowered there is an increasing divergence in amount of food consumed by the different groups. The data support the hypothesis that crowding is an important ecological factor at lowered, as well as at room temperatures."

Tanaka, Ryo. (Kochi Women's U., Kochi, Japan.) A CHANGE IN OUTBREAKING POPULATIONS OF THE BROWN RAT UNDER PRESSURE OF FREQUENT POISONING OPERATIONS DURING ONE YEAR PERIOD. Bul. Kochi Women's U. Vol. 6, Ser. of Nat. Sci., no. 2: 1-6, 2 figs. Mar. 1958.

In English. By comparisons with live-trap and bait-removal data, corpse-recovery rate was found to be a reliable index to population size. In several districts, rats were poisoned at intervals of from 20 days to 3 months. Poisoning success was about 50% on the average; population level stayed about the same. Results of poisoning with 1080 did not differ significantly from results of poisoning with phosphorus or cumarin.--L. F. Stickel.

## SCIURIDS

Folk, G. E., Jr., Mona R. Meltzer, and R. E. Grindeland. (U. Iowa, Iowa City.) A MAMMALIAN ACTIVITY RHYTHM INDEPENDENT OF TEMPERATURE. Nature 181 (4623): 1598. June 7, 1958.

Based on study of hibernating ground squirrels.

Hock, Raymond J. (Arctic Health Res. Center, Anchorage, Alaska.) THE ANNUAL CYCLE OF ALASKAN GROUND SQUIRRELS. Sci. in Alaska 1954. p. 33-43. 1957.

Abstract only. The cycle described here as studied in the Little Susitna region of the Talkeetna Mtns. is nearly invariable as to dates, bears little relationship to climatic events, and presumably is governed at least in part by length of day.

Mayer, Wm. V. (Arctic Aeromed. Lab., Ladd A.F.B., Alaska.) RELATIONSHIPS OF TEMPERATURE TO HIBERNATION IN THE ARCTIC GROUND SQUIRREL. Sci. in Alaska 1954. p. 37-38. 1957.

Abstract only.

Nichols, John T. (Am. Mus. Nat. Hist., N. Y. 24, N. Y.) FOOD HABITS AND BEHAVIOR OF THE GRAY SQUIRREL. J. Mamm. 39(3): 376-380. Aug. 1958.

Narrative report of observations made in Garden City, N. Y.

Pruitt, Wm. O., Jr., and Charles V. Lucier. (Box 282, College, Alaska.) WINTER ACTIVITY OF RED SQUIRRELS IN INTERIOR ALASKA. J. Mamm. 39(3): 443-444, 1 graph. Aug. 1958.

Small mammals of the subarctic spruce forest live beneath the snow in winter. Larger mammals, those of about 200 g. or more, usually live above the snow and are exposed to severe weather. Red squirrels become subterranean and subnivean. They make extensive burrow systems. They are almost never active above the surface when air temperature is below -25°F., and may or may not be active when the temperature is higher. "We also noted that squirrels were virtually never active when the difference between the temperatures of the air and the moss surface was greater than 20°F. or when the difference between the temperatures of the air and moss at 9 inches below the surface was greater than 30°F. Therefore the environmental conditions experienced by the red squirrels in winter are not those of the macroclimate" but resemble those experienced by small subnivean mammals.

Psenner, Hans. NEUES VOM MURMELTIER, MARMOTA M. MARMOTA (LINNÉ, 1758). Säugetierk. Mitt. 5(1): 4-10. Jan. 1957. [From J. Mamm. 39(3).]

## BEAVER

Kitts, W. D., May C. Robertson, B. Stephenson, and I. McT. Cowan. (U. of B. C., Vancouver.) THE NORMAL BLOOD CHEMISTRY OF THE BEAVER (CASTOR CANADENSIS). A. PACKED-CELL VOLUME, SEDIMENTATION RATE, HEMOGLOBIN, ERYTHROCYTE DIAMETER, AND BLOOD CELL COUNTS. Can. J. Zool. 36(3): 279-283. June 1958.

Libby, Willard L. (U. Alaska, College.) BEAVER AFFIDAVITS AS A MANAGEMENT TOOL. Sci. in Alaska 1954. p. 37. 1957.

Abstract only. "Each trapper of beavers [in Alaska] must submit an affidavit stating the number of beavers that he trapped and the locality in which they were caught. The affidavits obtained in 1949 from the Koyukuk Fur Management area were sorted. From these information was gathered on the total number of beavers caught, the average number obtained by each individual trapper, and the percentage of trappers who obtained the maximum limit of ten beavers. Estimates of the total number of beavers in the area were made through aerial transects. Their productivity was estimated from live-trapping and from carcass studies. As a result of this study, it was found that a large number of beavers could be trapped without harm to the area. The limit was then increased to 15 per trapper. Beaver affidavits obtained in the Territory for 1949, 1950 and 1951 have been sorted and tabulated by the villages and fur reporting districts. These have information as to the total number of trappers, the average number of beavers caught by each trapper and the percentage of those who obtained the limits."

## MUSKRAT AND NUTRIA

Cook, Arthur H. (16 Turkey Hill Rd., Ithaca, N. Y.) MUSKRAT DAMAGE CONTROL. N. Y. State Cons. 13(1): 30-31, 3 photos. Aug.-Sept. 1958.

Muskrats often damage dikes and dams. This damage is not easy to control. It isn't feasible to trap out all the animals or to eliminate their food over a large enough area. Heavy compaction of the earth doesn't stop burrowing. Even rip-rapping with stone doesn't prevent damage for more than a few years. Metallic mesh corrodes or muskrats gnaw through or dig under it. Two things do work. 1. Construction of earthen shelf or berm that extends 10-14 ft. out from dam at water level. 2. Installation of asbestos-cement sheets (4 x 8 ft.) in trench in dam. Sheets should be 2 ft. under water level, 2 ft. above. Cook tells how to install this barrier. See also author's paper on same subject in N. Y. Fish & Game J. 4(2): 213-218.

Huenecke, H. S., A. B. Erickson, and W. H. Marshall. (US F&WS, Minneapolis, Minn.) MARSH GASES IN MUSKRAT HOUSES IN WINTER. J. Wildl. Mgt. 22(3): 240-245, 3 photos. July 1958.

Because of reports of dead Muskrats in certain peat marshes north of St. Paul, Minn., gases in Muskrat houses were studied in winter of 1949-50. Equipment and methods are described. The only gas that accumulated in the houses was $CO_2$. "There was a gradual build-up to concentrations of 5-7 per cent in early February followed by a sharp decline by mid-March. On the basis of reports in the literature, it was concluded that concentrations of this magnitude would have no effect on muskrats."

Schreier, Otto. THE PRESENT DISTRIBUTION AND ECONOMIC SIGNIFICANCE OF THE MUSKRAT IN AUSTRIA. Pflanzenschutzber. 16(7-9): 97-121, illus., map. 1956. [From Biol. Abs. 32(7).]

In German. The muskrat occurs in all Austrian provinces; a rather strong local incidence, however, has been reported only from Lower Austria, Upper Austria, Burgenland and Styria. On the whole their abundance has been decreasing for many years. In Austria the muskrat is destructive by reason of its burrowing, but this damage seems to be unimportant compared with that done in other countries. Hunters and fishermen are able to keep the muskrat within limits; therefore more intensive control under official auspices is not necessary. All neighboring countries which may fear an invasion by muskrats from Austria, seem to be more infested by muskrats than is Austria itself, but most of them do not carry out control campaigns.--Auth. summ.

## FUR ANIMALS, GENERAL

Branch of Wildlife Research. FUR CATCH IN THE UNITED STATES, 1957. US F&WS, Wildl. Leafl. 398. 3 p. Sept. 1958.
Tabulation by species and state.

Lueth, Francis X. (Box 415, Centerville, Ala.) COMPARATIVE METHODS OF OBTAINING FUR CATCH DATA. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 128-131. 1956 (1957).
Summary: "1. Three different methods of obtaining fur catch data have been used in Alabama for the past three seasons. 2. The tag system provides information on the number of furs taken; but allows some misinterpretation of data. It provides additional revenue for the Department. 3. The questionnaire not only provides information on number of furs taken; but also information on the value of the fur and the amount of time taken to harvest the crop. The biggest disadvantage is the time and money expended in getting the information. 4. Dealers reports can give information on numbers of furs taken, value of furs taken, and seasonal variations in the value of furs. If studies are for total numbers and values of furs only, dealers reports permit a cheap and relatively easy method of getting fur-catch data."

Roberts, Wm. I., III. THE FUR TRADE OF NEW ENGLAND IN THE SEVENTEENTH CENTURY. Ph.D. thesis, U. Pa. 290 p. 1958. [From long abstract in Dissertation Abstracts 19(1).]

## BEARS

Woodworth, Jim. THE KODIAK BEAR / ALASKAN ADVENTURE. Stackpole Co., Harrisburg, Pa. vi + 203 p., illus. 1958. $5.00.
A veteran guide writes about his experiences and adventures in hunting the big bears. The book has a little information of reference value, but it is strictly incidental to the narrative and to suggestions about guns and equipment. When will the great bear attack man? Woodworth agrees with other experts that bears will attack when wounded by bullet or by fighting, when guarding a kill, or when guarding cubs. Attacks under other conditions are not to be expected. Weights of Kodiak bears range up to 1346, but a large bear in fall might weigh 1500 lbs. at a maximum.

## RACCOON, RINGTAIL, COATI

McKeever, Sturgis, George W. Gorman, Mildred M. Galton, and Anna D. Hall. (US Pub. Health Serv., Atlanta, Ga.) THE RACCOON, PROCYON LOTOR, A NATURAL HOST OF LEPTOSPIRA AUTUMNALIS. Am. J. Hygiene 68(1): 13-14. July 1958.
Infections in Grady Co., Ga., were verified. Raccoons may have been indirect source of infections in soldiers at Fort Bragg, N. C.

Thorgersen, Harold Louis. STUDIES OF TACTUAL DISCRIMINATION BY RACCOONS. Ph.D. thesis, Purdue U. 67 p. 1958. [From Dissertation Abstracts 18(6).]
"Seven raccoons, used as subjects, adapted quickly to the test situation, in which their exploration of the stimulus object was limited as far as possible to the tactile sense modality. After a short training period, the raccoons learned 28 form discrimination problems. The results obtained showed that a learning set developed, primarily during the solution of the first seven problems. The second part of the thesis was concerned with the relationship between size of the stimulus objects and the level of performance on a tactual discrimination problem." Results "indicated that the size of the stimulus objects used in the first study did not influence the learning results obtained."

Wilson, Kenneth A. (N. C. Wildl. Resources Comm.) CONTROL OF RACCOON PREDATION ON MUSKRATS NEAR CURRITUCK, NORTH CAROLINA. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 221-233, 4 figs. 1956 (1957).
Important paper on methods of controlling Raccoons by poison, and on effect of Raccoons on Muskrat populations. Summary: "Experiments to control excessive raccoon populations were conducted for five years (1952-56) on three study areas near Currituck, North Carolina. Techniques of control involved the use of strychnine with corn, eggs, persimmons, prunes and sardines. Of these, corn was

the most attractive to the raccoons and was the most durable. Full to partial control of the raccoon was achieved on two of the three study areas. The third area was remote from farmland and contained 'coons that apparently did not recognize corn as food. Control of the raccoon resulted in immediate muskrat population increases. The harvest on the Tice marsh increased from 35 pelts in the 1952-53 trapping season to 1,154 in 1955-56. Currently raccoon populations are high on most tidal marsh in the county and muskrat populations remain low. According to fur dealers' reports, the number of muskrat pelts purchased are about 75 per cent below normal."

MUSTELIDS

Hamilton, George T. RESURGENCE OF THE FISHER IN NEW HAMPSHIRE. Appalachia (Appalachian Mtn. Club, Boston, Mass.) 31(4) [New Ser. 23(12), Mag. no. 125]: 485-490, 1 pl. Dec. 1957. [From Biol. Abs. 32(7) and J. Mamm. 39(3).]

A large adult male of Martes p. pennanti is about 3 ft. long. Gestation period is 350-355 days. In N. H., varying hare and porcupine are favorite prey. A young fisher was reared by author; feeding and other habits are described. Potentially, this animal is New Hampshire's most valuable fur-bearer. The sp. was apparently widespread over the U. S. and Can. in 19th century, but after 1905 the number of pelts taken was negligible. Since 1935 the sp. has been protected in N. H., and at present seems to be abundant. Apparently it has adjusted to a changing environment.

Johansson, Bengt. (Cardiol. Lab., Allmänna Sjukhuset, Malmö, Sweden.) SOME BIOCHEMICAL AND ELECTROCARDIOGRAPHICAL DATA ON BADGERS. Acta Zool. 38(2/3): 205-218. 1957. [From Biol. Abs. 32(8).]

See abs. in Biol. Abs. 32(8).

Lensink, Calvin J. (US F&WS, Ft. Yukon, Alaska.) THE HOME RANGE OF MARTEN AND ITS SIGNIFICANCE IN MANAGEMENT. Sci. in Alaska 1954. p. 36-37. 1957.

Abstract only. "...adult females are relatively sedentary as compared to adult males and immature animals. The effect of actual movement of adult females into a new area, therefore, is probably of minor importance. The re-population of an understocked area must depend on the movement of immature females which had not previously established home ranges. The relatively low reproductive capacity of marten, coupled with the dispersal of only immature animals, would permit only a relatively slow establishment of a population over any considerable area. Dispersal movement, however, may contribute significantly to stabilization of populations adjacent to refuge areas or to the restocking of localized areas such as overtrapped lines. Because adult females occupy a smaller home range than other elements in the population, the adult females may be protected by spacing trap lines slightly farther apart than the diameter of the adult female's range. Protection of females of a polygamous species such as the marten, is the key to marten conservation. Traplines should be at least five miles apart, and where the marten supply is low, the trapping season should be as short as 30 to 45 days."

Liers, Emil E. (Homer, Minn.) EARLY BREEDING IN THE RIVER OTTER. J. Mamm. 39(3): 438-439. Aug. 1958.

Lutra canadensis ♀♀ seldom breed before they are 4 years old, ♂♂ when 2 years old. One of the author's otters mated as a yearling and when 2 years old gave birth to a litter of 4. Gestation period: 9 months and 18 days.

Reichstein, H. SCHÄDELVARIABILITÄT EUROPAISCHER MAUSWIESEL (MUSTELA NIVALIS L.) UND HERMELINE (MUSTELA ERMINEA L.) IN BEZIEHUNG ZU VERBREITUNG UND GESCHLECHT. Z. Säugetierk. 22(3/4): 151-170. 1957. [From J. Mamm. 39(3).]

Stegeman, LeRoy C. (N. Y. Coll. For., Syracuse 10.) THE COMMON SKUNK. N. Y. State Cons. 13(1): 4-6, 10 photos. Aug.-Sept. 1958.

The common Striped Skunk is predominantly beneficial in its feeding habits. Stegeman describes some interesting aspects of the skunk's feeding. He shows that skunks find and destroy large numbers of turtle eggs, and mentions the famous skunk-turtle-duck relationship. The amount of clover seed a field produces may be reduced by heavy skunk predation on bumblebees. Hives of honeybees

sometimes are visited by skunks so often (and the inmates rolled, crushed and eaten) that the colonies are weakened. A breeding colony of Bank Swallows was decimated by skunks that dug into the tunnels from above--and at just the right places. Crops of cabbage and potatoes have suffered serious damage by skunks digging up or around the plants to get at white grubs, which themselves were causing injury to the crop. Skunks often do considerable damage to sweet corn in the milk stage, but they are able to reach only ears near the ground. Stegeman has found, however, that skunks are beneficial in the main because they feed so largely on insects, mice, and carrion.

## DOGS, WOLVES, FOXES

Kelly, Maurice W. (US F&WS, Juneau, Alaska.) OBSERVATIONS AFIELD ON ALASKAN WOLVES. Sci. in Alaska 1954. p. 35. 1957.

Abstract only. "These observations...cover the six year period from 1948 to 1954, and record field findings of the distribution, movements, color, food habits, weights, reproduction and size of wolf packs." Travels often are extensive; they are governed largely by pattern of caribou migration. Color is highly variable, from black to white in the Arctic, commonly dark in se. Alaska. Stomach contents in winter most often include big game and Reindeer. Of 15 Wolves weighed, 1 exceeded 100 lbs. The av. Wolf, aside from pups, weighed between 70 and 85 lbs. Males av. 10 lbs. heavier than ♀♀. Mating usually occurs in late March and early April. Pups are born in late May and early June. All of the few dens examined had more than 1 entrance. The largest pack seen consisted of 10 individuals. Single wolves were seen frequently.

Rausch, Robert. (US Pub. Health Serv., Anchorage, Alaska.) SOME OBSERVATIONS ON RABIES IN ALASKA, WITH SPECIAL REFERENCE TO WILD CANIDAE. J. Wildl. Mgt. 22 (3): 246-260, 8 figs. July 1958.

Over a 9-year period (1949-57), 43 canids were proved rabid: Alopex lagopus, 19; Vulpes vulpes, 14; Canis lupus, 2; Canis familiaris, 8. Many others of these, not studied, showed clinical signs of rabies; these animals apparently were not affected by canine distemper or other diseases. Most outbreaks were recorded in tundra zone during colder months. It was not determined that rabies is important as a natural control of wild canine populations. Rabies was reported in wild canids in all years but 1951. The most extensive outbreaks were in 1954 and 1956. Nearly all dogs that proved to be rabid, or were so regarded on the basis of clinical signs, had a history of contact with wild canids, mostly foxes. Evidence is presented to show that "arctic dog disease," long known to affect canids in high boreal regions, is rabies. Differences recorded in clinical manifestations of the disease in such regions are not regarded as significant. It is believed by some that rabies virus in northern regions is less pathogenic for man, but this remains to be demonstrated. Three cases of rabies in man have been diagnosed clinically in Alaska. Control of rabies in Alaska probably could be achieved through regulation of dogs and local destruction of foxes when necessary. Vaccination of all dogs against rabies is prevented at present by economic and legal considerations.--Author.

Schofield, Raymond D. (Mich. Dept. Cons., Lansing.) LITTER SIZE AND AGE RATIOS OF MICHIGAN RED FOXES. J. Wildl. Mgt. 22(3): 313-315, 1 fig. July 1958.

A total of 1,809 Red Fox (Vulpes fulva) litter records collected in Mich. indicate a state-wide av. of 5.1 pups per litter. There is a significant difference in litter size between regions: Upper Peninsula litters av. 4.6 pups, n. Lower Peninsula 5.1 pups, and s. Lower Peninsula 5.5 pups. The reproductive rate of Mich. Red Foxes is not consistent from year to year and may fluctuate as much as 1 pup per litter. Age ratios of foxes bountied during April, May, and June substantiate findings from analysis of litter-size data.--Author.

Tembrock, Günter. ZUR ETHOLOGIE DES ROTFUCHSES (VULPES VULPES [L.]), UNTER BESONDERER BERÜCKSICHTIGUNG DER FORTPFLANZUNG. Zool. Garten (Leipzig) 23(4-6): 289-532 [sic], illus. 1957. [From J. Mamm. 39(3).]

## CATS

Anon. AROUND THE STATE. Fla. Wildl. 12(4): 27, 4 photos. Sept. 1958.
The Fla. puma, declared a game animal a few years ago and given the partial protection that status afforded, was given complete protection in July 1958. "A serious decrease in the panther population and a desire to keep the animal from becoming extinct were the reasons for again placing the largest of America's cat family on the protected list in Florida."

Manville, Richard H. (US F&WS, Natl. Mus., Wash. 25, D. C.) ODD ITEMS IN BOBCAT STOMACHS. J. Mamm. 39(3): 439. Aug. 1958.
Eight digestive tracts, 2 of them from Montmorency Co., Mich., were examined. Three were nearly empty. One had masses of the nematode Physaloptera (praeputialis?), 3 contained porcupine remains, 2 contained snowshoe-hare fur.

## BIG GAME, GENERAL

Benson, D. A. (Nova Scotia Dept. Lands & For., Halifax.) MOOSE "SICKNESS" IN NOVA SCOTIA. Can. J. Comp. Med. & Vet. Sci. 22(7): 244-248. July 1958.
Summary: "Studies of 47 cases of an obscure 'disease' of moose carried out in Nova Scotia have been described, with particular stress on 28 cases subjected to post-mortem examination. Insofar as identification of a causative agent or condition is concerned the evidence was negative. Details are presented as derived from field observations, gross necropsy findings, and blood, bacterial, serological and virological studies." History and fluctuations of Moose in Nova Scotia are reviewed briefly.

Benson, D. A. (Nova Scotia Dept. Lands & For., Halifax.) MOOSE "SICKNESS" IN NOVA SCOTIA - II. Can. J. Comp. Med. & Vet. Sci. 22(8): 282-286. Aug. 1958.
Second of 2 papers on an obscure disease of Alces. The sickness described from Minn. by Fenstermacher, from Maine by Lamson, and from N. S. by Benson is a single entity. It is characterized by deterioration of neural tissue in brain. Histopathological studies of body tissues yielded little information. No organism or pathogen was found responsible for the disease. Experimental treatments with cobaltous chloride, other minerals, and plenty of food were successful in only 1 individual and were not successful in 6 others. Climatic change toward warmer and dryer weather, operating through environmental changes and resultant nutritional problems, is believed to be responsible for moose sickness and for decrease of moose population in last 25 years.

Branch of Wildlife Research. BIG GAME INVENTORY FOR 1957. US F&WS, Wildl. Leafl. 399. 3 p. Sept. 1958.
Tables show estimated populations and kills of each type of big game in each U. S. state. Wild turkey is included, but only 2 exotics: wild boar and Barbary sheep. Individuals fenced on parks or refuges are not counted. By this criterion, no mention is made of the grizzlies of Yellowstone, which certainly are not fenced, and not one of the large bison herds on refuges is counted. Fallow deer, which occur in 5 Nebr. counties, are not mentioned, nor are the sika deer, which are wild in e. Md., nor axis deer, which are wild in 4 Fla. counties. Presumably the states cannot supply figures or estimates for these and other exotics, but few points are of greater interest and potential importance.

Dodds, Donald G. (Dept. Mines & Resources, Cormack, Newf.) OBSERVATIONS OF PRE-RUTTING BEHAVIOR IN NEWFOUNDLAND MOOSE. J. Mamm. 39(3): 412-416. Aug. 1958.
Summary: "Eight hundred and sixteen moose observations were made between June 20 and September 22, 1953, in central Newfoundland. Bull groupings were uncommon until mid-August. Between August 18 and September 15, 98 animals were observed in aggregations of from three to ten. Seventy-five of the total number in these aggregations were adult bulls, three were two-year-old bulls and five were yearling bulls. Behavior within the aggregations suggested the formation of a breeding status in male animals. Formation of this status was realized in three essential steps: (1) the grouping of male animals, (2) belligerent action between two or more males within a group, and (3) acceptance of status. Breeding appeared to have begun by September 9. Yearlings and two-year-old males were rarely observed with other animals at this time."

Edwards, R. Y. (Dept. Recreation & Cons., Victoria, B. C.) LAND FORM AND CARIBOU DISTRIBUTION IN BRITISH COLUMBIA. J. Mamm. 39(3): 408-412, 1 map. Aug. 1958.

Summary: "Field work in British Columbia has suggested that mountainous areas inhabited by caribou (Rangifer arcticus) have a characteristic land form. Inhabited areas have rolling mountains with summits above treeline, or are elevated tablelands. These are often transitional areas, both in land form and in location, between plateaus and ranges of precipitous mountains. A test of this theory by comparing two maps of the province, one showing land forms, the other the areas used by caribou in winter, has substantiated the relationship. It is concluded that the so-called mountain caribou of British Columbia does not inhabit precipitous mountain masses, but rather finds suitable environment where rolling mountains and tablelands permit the existence of extensive arctic-alpine meadows with associated open subalpine forests."

Edwards, R. Y., and R. W. Ritcey. (Dept. Recreation and Cons., Victoria, B. C.) REPRODUCTION IN A MOOSE POPULATION. J. Wildl. Mgt. 22(3): 261-268, 1 fig. July 1958.

Uteri from 218 Moose from Wells Gray Park, B. C., were collected in fall and winter over a 5-year period. Twenty % were from yearlings, a year class that does not reproduce in this area. Older females were 76% pregnant; 22% of pregnancies involved twins. There were no detectable variations of these due to age of ♀♀. When pregnancy and twinning rates were examined for variation by years and months, only the latter exhibited significant differences. Samples were taken in lowlands. The more Moose there that had migrated from subalpine summer range, the higher the proportion of twins. Differences in nutritional quality of foods in high and low summer ranges may be a factor influencing incidence of twins. When lengths of foeti were plotted over dates of collection, resulting patterns suggested that calves are conceived in 4 periods of oestrus, that the time between successive oestri is 30 days, and that 85% of calves are conceived in 1 of these oestri, probably in late Sept. and early Oct. Most ♀♀ conceive in the same 10 day period each year, suggesting regulation by photoperiod.--R. Y. Edwards.

Flyger, V. F., and J. R. Bowers. (Box 1510, Annapolis, Maryland.) THE SIKA DEER OF JAMES ISLAND, MARYLAND. Md. Tidewater News 14(4): 13-14. July-Aug. 1958.

A herd of Cervus nippon has lived on James Island, Dorchester Co., Md., since 1918, when 4-5 were released. The herd numbered at least 270 in 1957. In Aug. 1957 a fire destroyed vegetation on part of island, reducing food supply, and with hard winter of 1957-8 caused death of 161 deer. Sika deer have, however, spread to Taylors Is. and to the mainland of Dorchester Co. and are continuing to spread. These deer have survived and multiplied on James Is. under conditions that would not support native whitetails. They may become either severe pests or valuable game animals. The Sika of James Is. weigh only 40-60 lbs. and have small antlers. Differences between Sika Deer and Whitetail Deer are described. Among other features, all individuals are spotted, and there is a small canine tooth about an inch in front of the upper jaw teeth.

Gibbs, Harold C., and John S. Tener. (Can. Wildl. Serv., Ottawa.) ON SOME HELMINTH PARASITES COLLECTED FROM THE MUSK OX (OVIBOS MOSCHATUS) IN THE THELON GAME SANCTUARY, NORTHWEST TERRITORIES. Can. J. Zool. 36(4): 529-532. Aug. 1958.

Three species of nematodes and 3 species of cestodes are reported from 3 adult ♂♂. Pathology, if any, is discussed. The worms are common to all kinds of ruminants of the N.W.T. Authors believe that a musk ox that died in U. S. from infestation of Haemonchus contortus picked up the parasite from U. S. cattle, and that Haemonchus does not and could not exist in northern Canada. List is given of helminths known to occur in wild musk oxen.

Halloran, Arthur F. (Wichita Refuge, Cache, Okla.) LONGHORN CATTLE WEIGHTS AND HORN MEASUREMENTS. Proc. Okla. Acad. Sci. 38: 135-136. 1958.

Data for various members of Wichita Refuge herd are given by age group. It is interesting to learn that steers have much longer horns than bulls have.

Hyslop, R. S. (Ont. Dept. Lands & For., Port Arthur.) MOOSE AND SPRUCE. Sylva (Ont. Dept. Lands & For.) 14(4): 40-41, 1 fig. July-Aug. 1958.

During the 1957 season in Ont., 19,262 Moose hunters spent $2,825,000 and shot nearly 6,000 Moose. Income to Ont. from sale of Moose licences was $364,883. The money spent by hunters was more than the price of 125,000 cords of spruce pulpwood. Revenue from licences was more than the province would gain from sale of 110,000 cords of spruce. Almost all Moose hunting was done within 1 mi. of a road. Perhaps it would be worthwhile to make access roads for Moose hunting. After all, harvest of 125,000 cords of pulpwood usually requires much roadbuilding. What is the future of Moose hunting in Ont.? Hunter harvest was about 6% of herd in 1957; some people say the kill might safely have been 20%. Thus Moose hunting might more than triple in size and value. Then its economic significance would be equivalent to that of a cut of 400,000 cords of spruce pulpwood.

Mottl, Stanislav. (Inst. Forstwesen & Jagdkunde, Zbraslav n./Vlt. III, 195, Czechoslovakia.) DIE JAGDWIRTSCHAFTLICH ERFORDERLICHE MINDESTGRÖSSE VON REHWILDREVIEREN IM WALDE. Z. Jagdwissensch. 3(2): 64-69, 1 graph. 1957.

In German. English summary: "The lowest number of a stock of roe deer to be dealt with from the shooting point of view is stated to be 40 heads. This stock's demand for space has been inquired in for different types of shooting areas. As a basis was chosen the average size of the territory and the radius of action of a single head of deer. By closely observing certain animals and by following the traces in snow the size of the territory was calculated to amount to 15.3 ha and the radius of action 955.3 m in original environment, in cultivated environment 19.1 ha resp. 1105.7 m. The size of territory wanted by 40 roes depends on the quality of the shooting area and amounts to between 600 ha and 1200 ha."

Olson, Sigurd T. (Apt. 13, 1101 Sixth, Fairbanks, Alaska.) DISTRIBUTION OF SOME BIG GAME ANIMALS IN SOUTHEAST ALASKA WITH PARTICULAR REFERENCE TO THE SITKA BLACKTAIL DEER. Sci. in Alaska 1953. p. 182-186. 1956.

Discusses briefly the regional range of Blacktail Deer, Moose, and Mtn. Goat in relation to topography and climate. Also mentions certain distributional peculiarities of bears and wolves.

Tener, J. S. (Can. Wildl. Serv., Ottawa.) THE DISTRIBUTION OF MUSKOXEN IN CANADA. J. Mamm. 39(3): 398-408. Aug. 1958.

Study of present and former distribution and numbers in different areas. Summary: "For fifty-five years, 1862-1917, muskoxen in Arctic Canada were hunted intensively for meat and hides. At least 15,000 skins were traded during this period. By the time complete protection was granted the species in 1917, only remnant populations existed on the mainland, in the Bathurst Inlet region, the Thelon Game Sanctuary, and the base of Boothia Peninsula. The mainland population in 1930 was estimated to be 500. Populations on the Arctic islands suffered varying fates. They were virtually exterminated on Banks and Victoria islands and heavily hunted on Melville and Ellesmere islands. Information gathered largely over a five-year period, 1951-1955, indicates that muskoxen are increasing in numbers and reoccupying much of their former range. This is true of the mainland where the population today is believed to be about 1,500, and of the Arctic islands whose populations are believed to total 3,500."

Ulfkjoer, Kai. DANISH ROE-DEER HEADS MEASURED DURING THE YEARS 1948-55. Danske Vildtundersøgelser, Hefte 6. 1-23 p., 7 photos. 1956.

In Danish with English summary and legends. Numerous heads (antlers) from all over Denmark were rated and measured. Results are reported. Good heads came from all parts of the country, even from poor heath plantations. Good heads occurred in all age groups from 3 to over 7 years, not in just a few age classes.

v. Braunschweig, A. (Kirchbachstr. 157, Bremen, Germany.) ROE DEER MORTALITY IN THE WINTER OF 1955/56. Z. Jagdwissensch. 3(2): 69-79. 1957.

In German with English summary. Many roe deer died in the vicinity of Giessen, Germany, during an unusually severe winter. Bacteriological and pathological studies of 33 specimens gave no evidence of bacterial disease or starvation. The author concludes that these deer simply died from severe cold after the hormone of the suprarenal glands was entirely used up.--V. F. Flyger.

v. Lehmann, Ernst. (Nettekoven bei Bonn, Germany.) THE HETEROGENEITY OF EUROPEAN ROE DEER. Z. Jagdwissensch. 3(2): 53-63, 7 figs. 1957.

In German. Habitat improvement for roe deer does not result in larger animals and better animals because hereditary factors for these characteristics are lacking. The small roe deer (Capreolus capreolus) existing in w. Eur. today is a mixture of several groups that came together after glaciation. Large roe deer existed in Eur. in interglacial periods, but were replaced (except in Siberia) by the smaller variety.--V. F. Flyger.

Westman, Hans. THE DAMAGE CAUSED BY ELK [MOOSE] TO YOUNG STANDS. Kungl. Skogshögskolans Skrifter [Bul. Royal Sch. Forestry, Stockholm, Sweden] no. 28. 148 p., 23 figs. 1958. Price: 5 Swedish kr., paper cover. [Copy in US Dept. Int. Library.]

In Swedish with 3-p. English summary and English legends. A long technical study of the effect of moose in Sweden on forest reproduction under different circumstances. The bibliography of 4.5 p. contains mainly Swedish titles and does not mention R. L. Peterson's papers on moose although that of Hosley is cited.

Williams, Ralph B., and Bert B. Babero. (Alaska Dept. Health, Juneau.) ONCHOCERCA IN AN ALASKAN MOOSE. J. Mamm. 39(3): 449-450. Aug. 1958.

Numerous thread-like nematodes were found in flexor tendons and subcutaneous tissues of hind legs of a moose killed about 15 mi. e. of Juneau. Joints of the moose did not appear normal; they had extensive nonarticular cavities which may have been erosions.

Young, Stanford. (Natl. Park Serv., Wash., D. C.) EXCLOSURES IN BIG GAME MANAGEMENT IN UTAH. J. Range Mgt. 11(4): 186-190, 2 figs. July 1958.

Discusses study of various exclosures and their results. Also makes recommendations as to establishment, maintenance, and study of enclosures. See also WR 82 p. 21, 84 p. 28, and 86 p. 50 for other reports by Young on same study.

## DEER (Odocoileus)

Chiavetta, Kenneth J. (N. C. Wildl. Resources Comm.) HARVEST ANTLERLESS DEER! N. C. Wildl. 22(7): 16-19, 6 figs. July 1958.

N. C. now can have special antlerless deer seasons where needed. In 1957, such seasons were held in 4 management areas where deer were too numerous. The special hunts were for 1/2 day. They resulted in kill of 217 antlerless deer: 42 ♂ fawns, 46 ♀ fawns, 115 adult does, 18 antlerless bucks. As usual in tests of this sort, there was no evidence that adult ♀♀ had been stockpiled, for old ♀♀ were nearly as scarce as old ♂♂. Hunter success was almost twice as great as in buck hunting. Study of ovaries revealed that 37.5% of ♀ fawns had been bred. Mean ovulation rate of fawns varied from 0.16 to 0.42; the figure would be 0.50 for properly stocked range. Eighty-six per cent of yearlings had been bred. Of adult ♀♀, 93% had bred in current year and 100% in last 2 years. One doe 9.5 years old had had twins. Av. ovulation rates for adult ♀♀ varied from 1.35 to 1.75; they should be about 2.0 on properly stocked range. The areas in which antlerless hunts were held have too many deer and some serious overbrowsing; even overgrazing is evident. Need of further antlerless-deer hunts is clear.

Davey, Stuart P. (Va. Game Comm.) FERTILITY AND REARING SUCCESS MEASUREMENTS ON VIRGINIA'S DEER HERDS. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 47-51. 1956 (1957).

These measurements were based on study of 12 areas for 4 years. Fertility was ascertained from reproductive tracts. Rearing success was judged from observations, kill ratios, and age classes of does. Good deer range had deer of high fertility and high rearing success. Rearing success varied from about 55% to 100%, depending on area. "In all areas, approximately 80-90% of the estimated maximum number of conceptions per 100 doe deer of all ages gave that area's fall rearing success." Statistical data from the study are presented, and methods of judging rearing success are compared. Author concludes that knowledge of rearing success was of great aid in planning levels of kill. "Even in the areas of lowest rearing success 20% of the doe population can be lost annually without

detriment to the next year's fall population; in the best areas, this percentage increases to 33%. In terms of harvest this means that the minimum goal should be equal numbers of antlered and antlerless (60% bucks--40% does). In the better areas twice as many anterless as antlered should be and can be taken; this giving approximately equal sex ratios."

DEER MANAGEMENT SEMINAR. Pa. State U. (U. Park), Extension Conf. Center, May 27, 1958.

A portfolio of 6 mimeographed papers that were presented at a half-day adult-education symposium. Although not burdened with too much technicality, the papers are highly factual and informative. They are based on both published and unpublished data and most of them cite several worthwhile references, including theses. Some economic aspects of deer management, by John C. Frey, reviews the economic status of deer in Pa. and the conflict of interests involved. The basic facts of this paper are familiar through the publications of Pasto and Thomas. Deer and forestry, by W. C. Bramble, gives much information on damage done by deer to natural forests and plantations in Pa. White-tailed deer biology, by P. F. English, brings together the basic facts on deer reproduction and tabulates the deer kill in Pa. since 1915. Some aspects of deer nutrition, by R. W. Swift, reviews the subject with emphasis on experimental data recently published by French, McEwen, Magruder, Ingram, and Swift. Deer ecology--The impact of deer on natural vegetation, by Ward M. Sharp, shows what a serious effect heavy densities of deer are having on various desirable trees and shrubs in Pa. The role of education in public policy, by Fred R. Robertson, points out that the facts have been made clear and that it is up to the public and its representatives to arrive at fair solutions through democratic means.

DeGarmo, W. R., and John Gill. WEST VIRGINIA WHITE-TAILS. Cons. Comm. W. Va., Div. Game Mgt., Bul. no. 4. vii + 87 p., 12 figs. + sketches. June 1958.

Major paper on biology and management of deer in W. Va. It is written to be useful to both laymen and technicians. Appendixes present data, by county, on restocking, kills, foot length, weights, corpora lutea, and non-hunting mortality; one appendix describes aging technique.

Deer declined to small, local populations under unrestricted hunting until 1909, then increased under legal hunting until a kill of 21,951 (hunter's choice) was made in 1951. Extensive crop damage and winter mortality appeared in the 1940s, and experiments with antlerless seasons soon began. In 23 years of buck seasons, 41,747 deer were shot, but in only 6 years of hunter's choice, 106,877 were shot.

Breeding occurs Oct.-Jan. with peak in late Nov. Peak of fawning is in June. Plants of many kinds are eaten; rhododendron, supposedly a poor food, is used heavily in winter and serves as an indicator of overbrowsing. Weights, growth, and reproduction differ regionally and are related to quality of food.

The state is hilly, 64% forested, chiefly with hardwoods, and is excellent deer country. Future deer populations will depend largely on rate and type of timber cutting. The state has been divided into deer-management areas. Potential in most areas is good, and abandonment of farms is helping in some areas. Detailed plans for regulation of hunting have been worked out to take account of local changes in populations and kills. Suitable numbers of does must be shot in some areas, but other areas still need restocking. Proper distribution of hunters is a major problem. For deer, timber should be cut in winter; this provides winter food and vigorous sprouts later. Five to 10 acorn-bearing trees should be left per acre. Small or partial cuts are better than clearcutting. In conifers, enough trees should be left to provide cover. Research is still needed on timber management in relation to deer, on methods of evaluating size and condition of local populations, and on nutritional cause of regional differences in size and production of deer.

Dietz, Donald R. (Colo. Game Dept.) EXPLORATORY ANALYSIS OF BROWSE SAMPLES. Colo. Game & Fish Dept., Job Completion Rep., Fed. Aid Proj. W-38-R-11, Work Plan 3, Job no. 17. 1-37 p., 6 figs. Apr. 1958.

Detailed report on chemical analyses of nutritive components of Big Sagebrush, Bitterbrush, Mtn. Mahogany, Gambel Oak, and Serviceberry. Deer-management significance of findings is discussed. Special consideration was given to seasonal levels of protein, phosphorus, and carotene. Big Sagebrush was significantly

higher in protein during the critical winter period when other species were low. Leaves of browse species were higher in protein, phosphorus, and carotene than stems. Only Big Sagebrush and Serviceberry were high enough in phosphorus throughout year. Carotene content varied seasonally more than with species, but appeared adequate throughout year. Deer had a definite tendency to select the most nutritive browse at each season. They utilized sage heavily only in late winter; sage is then highly important. Seasonal sequence of browsing is well ordered to make for health and vigor of deer. "Each essential nutrient is thus supplied at adequate levels at all seasons. It is equally apparent that no one or two of the browse species would supply an adequate diet the year around. The inescapable conclusion is, then, that the deer range, and particularly the winter range, must contain a mixture of good browse species, in quantity ample to sustain the herds involved. Obviously, the only means of accomplishing this objective is that of keeping the herd, through adequate harvest, within the carrying capacity of the range."

Eberhardt, Lee. (Mich. Dept. Cons.) DEER IN 1958 / SIGNIFICANCE OF RECENT INFORMATION. Mich. Dept. Cons., Game Div. Info. Cir. 113. 24 p., illus. Aug. 1958.

These annual reports on the Mich. deer herd give much information--by areas of the state--on kills, hunter success, age groups, fawn production, fawn survival, and deer condition. Data for several years are given for comparison. Points made are illustrated by graphs, maps, and sketches. The report is intended for both technical men and serious-minded hunters. The theme running throughout is the need for proper herd control to reduce winter kill and crop damage and to allow deer to reproduce, survive, and grow at good rates.

Haugen, Arnold O., and Daniel W. Speake. (Iowa State Coll., Ames.) DETERMINING AGE OF YOUNG FAWN WHITE-TAILED DEER. J. Wildl. Mgt. 22(3): 319-321, 2 figs. July 1958.

A technique was developed to determine age of young fawns of Odocoileus virginianus osceola. To determine age of fawns, distance from hairline to distal edge of new hoof growth following birth is measured. This measurement in mm. is then multiplied by 2.2 and 0.66 is added. The resulting sum is the estimated age in days. Physical characteristics associated with age are included.--Authors. [See also WR 91: 69.]

Jones, Milton B., and Wm. M. Longhurst. (U. Calif. Field Sta., Hopland, Calif.) OVERHANGING DEER FENCES. J. Wildl. Mgt. 22(3): 325-326, 2 figs. July 1958.

Two types of low-cost, sloping deer fences were tested. The first consisted of a 2-ft. vertical segment with a 6-ft. 25° slope extension in the direction of the deer pressure. The objective was to have the approaching deer go under the sloping wire before contacting the vertical wire. This fence was tried around a plot of Sudan-grass pasture that was being heavily used by deer and sheep. Later it was used to fence fertilized plots on annual resident range that were particularly attractive to deer. In another test, a 6-foot roll of chicken wire was used with one edge fastened to the ground with stakes, and extending upward at an angle of approximately 49°. Both were completely effective in turning back deer and sheep.--Authors.

Lay, Daniel W. (Texas Game Comm., Buna.) SOME NUTRITIONAL PROBLEMS OF DEER IN THE SOUTHERN PINE TYPE. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 53-58. 1956 (1957).

Summary: "1. Winter is the most critical period for deer because the quantity and quality of the food supply is lowest at that time. 2. Winter browse contains about 6 per cent protein and 0.16 per cent phosphoric acid. The minimum adequate level appears to be about 7 per cent protein and 0.35 per cent phosphoric acid. Fifteen evergreen species averaged 7.56 per cent protein and 0.16 phosphoric acid. Ten deciduous species averaged 4.06 per cent protein and 0.14 phosphoric acid. 3. A division of the available herbage into three categories of palatability, with utilization of half of the season's growth of desirable species, shows that only one-third of the available herbage may be used by deer and/or cattle. A general browse line will not be present when carrying capacity is reached. 4. Carrying capacity for deer can be increased with plantings of winter

greens, fertilization or release of common desirable species, prescribed burning, timber removal, increasing the acorn supply, removal of hogs and cattle, or with plantings of palatable evergreens. Herd control is necessary, regardless of the carrying capacity." The paper includes valuable tabulations of nutritive value and palatability of various plants.

Lovaas, Allan L. (Mont. Game Dept., Billings.) MULE DEER FOOD HABITS AND RANGE USE, LITTLE BELT MOUNTAINS, MONTANA. J. Wildl. Mgt. 22(3): 275-283, 4 figs. July 1958.

A study of Mule Deer range use and food habits was conducted during summer of 1956 and winter of 1957, with some work in fall and spring. Range use was determined by recording numbers of deer seen on various vegetative types while traveling observational routes. Food habits were investigated by rumen analyses and feeding site examinations. These 2 methods of studying food habits gave very comparable results. Major differences were found in food habits between 2 types of winter ranges. Doe-fawn ratio counts were made; reproduction in the study area was poor.--Author.

Mangold, Robert E. (N. J. Div. Game.) A REPORT ON THE SEX AND AGE OF DEER KILLED IN THE HARBOURTON AREA. N. J. Outdoors 9(3): 2-11, 6 photos. Sept. 1958.

At the request of farmers around Harbourton, N. J., the N. J. Game Div. shot 264 deer in Feb.-Mar. 1958. The area is one of good farmland and small woods. All deer except fawns were fat. Only 2 of the deer were legal bucks and they were yearlings; the rest of the legal bucks had been taken by prior sport hunting. Of the 200 does aged, 55 were fawns, 52 were 1.5 years old, 44 were 2.5, 25 were 3.5, 18 were 4.5, and 1 was 6.5 years old. Of 138 does more than a year old, 96.4% were pregnant. Of 55 fawn does, 25.5% were pregnant. All but 1 of 48 yearling does were pregnant; they av. 1.6 fetuses. The 38 pregnant 2.5-year-olds av. 1.9 fetuses. The 48 does of 3 or more years were all pregnant and av. 2.1 fetuses. Of the fetuses, 123 were ♂ and 138 ♀; studies elsewhere have shown predominance of ♂♂. The fawns were 62 ♂♂ and 55 ♀♀. Peak of rut was dated back to Nov. Adults bred earlier than fawns. Data from the present study are compared with those of other studies made in N. J. and other states. "Of 264 deer examined, 64 were males and capable of breeding in the fall of 1958. From the standpoint of the productive potential of the herd, the sex ratio of one breeding male to 3.1 adult females would have insured a high rate of fertilization with resultant good production." Looking at the data in another way, one can say that a herd can remain highly productive even when almost all the legal bucks are shot out.

May, Morton. (Rocky Mtn. For. & Range Exp. Sta., Laramie, Wyo.) BIBLIOGRAPHY ON DEER-RANGE RELATIONSHIPS. Wyo. Range Mgt. no. 115. 5 p., mimeo. Apr. 1958.

Lists 76 titles on deer nutrition and range relationships. Papers cited pertain to both e. and w. U. S.

Shotts, E. B., Wm. E. Greer, and F. A. Hayes. (Sch. Vet. Med., U. Ga., Athens.) A PRELIMINARY SURVEY OF THE INCIDENCE OF BRUCELLOSIS AND LEPTOSPIROSIS AMONG WHITE-TAILED DEER (ODOCOILEUS VIRGINIANUS) OF THE SOUTHEAST. J. Am. Vet. Med. Assn. 133(7): 359-361, 1 fig. Oct. 1, 1958.

A product of the SE. Coop. Deer Disease Study. "...the results of this investigation indicate a prevalence of only 0.25 per cent brucellosis and 1.73 per cent leptospirosis among the [403] animals [from 12 states] surveyed. Continued studies on these diseases are anticipated in 1958 and 1959."

Sumner, Lowell. (Natl. Park Serv., Three Rivers, Calif.) NEEDED: GREATER HARVEST OF DEER. Outdoor Calif. 19(4): 12-14, 4 photos. Apr. 1958.

Discusses range damage by deer in and near various Calif. national parks and advocates herd control on adjacent lands by means of either-sex shoots or other forms of increased hunting. Of especial interest is the author's repeated recommendation that puma populations should be allowed to build up in areas where deer are not, or cannot be, adequately hunted. At present, pumas are too strictly controlled in some of these areas. In Sequoia Natl. Park, where interrelation of deer and puma ranges have been studied, the undamaged deer range definitely does coincide with the best populated puma range.

DEER (Odocoileus)--Continued

Taber, Richard D., and Raymond F. Dasmann. (Mont. State U., Missoula.) THE BLACK-TAILED DEER OF THE CHAPARRAL / ITS LIFE HISTORY AND MANAGEMENT IN THE NORTH COAST RANGE OF CALIFORNIA. Calif. Dept. Fish & Game, Game Bul. no. 8. 1-163 p., 49 figs. 1958.

A major monograph for biologist, landowner, or hunter. Technical, quantitative material is relegated to graphs and tables so far as possible. The text is kept simple and readable. The first part, p. 5-62, is a narrative account that covers the whole report. It traces the history of deer in the Lake Co. study area, discusses biology of deer throughout year as determined by 7 years of intensive study, and takes up management of habitat and herd. The second part, p. 63-163, consists of 10 appendices. Here methods, quantitative data, and other material of interest mainly to technical men are reported in detail, but still the text is kept simple. The paper treats a wide range of subjects, including reproduction, effects of hunting, seasonal behavior, movements, home ranges, antler development, weight changes, population dynamics in different habitats, mortality, life tables, and parasites. Emphasis, however, is on food, nutrition, and management in relation to the habitat. Chaparral of low value to deer covers the ridges. Mostly it is too tall, too dense, and too dominant to provide good feed--but large patches should be left for cover. Well-planned burning, mechanical treatment, and planting, backed by herbiciding, increase the carrying capacity by several times. The aim is to convert selected portions of the chaparral to low shrubland in which most of the woody browse is within reach, and in which annual and perennial herbs can grow. Good instructions for this management are given, with full consideration of seasonal needs and habits of deer. Management of this sort is not a one-shot cure--it requires maintenance or repetition. And in the long run it requires adjustment of herd size to carrying capacity. At present a large part of the herd is lost through shortage of food, reproduction is lower than it might be, harvests are smaller than they should be, and the herd is so large that it can ruin small, scattered areas of improved habitat. Because of this last factor, strong local improvements, which are subject only to pressure of local deer, are better than many weak, scattered improvements that are subject to many deer.

van Dresser, Cleveland. HAVE THE KEY DEER BEEN SAVED? Fla. Wildl. 12(3): 24-25, 38, 2 figs. Aug. 1958.

The Key Deer is thought to be increasing and a refuge for it has been authorized. But where does the matter really stand? The F&WS is authorized to spend $35,000 to acquire up to 1,000 acres. The refuge now consists of 18.5 acres owned and 6,000 acres leased from private landowners. These leases can be terminated on 90 days notice and 3 of the 17 leases already have been terminated. Commercial development in the Keys is booming and land values are soaring. $35,000 will buy little land today. At least $100,000 is needed. The Key Deer are little better off than they were in 1950. Law enforcement and habitat improvement can help, but more owned refuge land will be needed soon.

MAMMALS--MARINE

Berland, Björn. (Inst. Marine Res., Bergen, Norway.) THE HOOD OF THE HOODED SEAL, CYSTOPHORA CRISTATA ERXL. Nature 182(4632): 408-409. Aug. 9, 1958.

The extrusible, "paired" nasal bladders are really a single, bilobed bladder. "The extrusion of the bladder may be explained as follows: by closing one nostril, and by blowing out air through the nose, the mucous nasal septum is made to bulge into the opposite half of the nasal cavity and is extruded through the opposite nostril as a red bladder."

Clarke, Robert. MIGRATIONS OF MARINE MAMMALS. Norsk Hvalfangst-Tidende 46 (11): 609-630. Nov. 1957. [From J. Mamm. 39(3).]

Klumov, S. K. COASTAL LYING PLACES OF CALLORHINUS URSINUS AND LIVING PLACES OF ENHYDRA LUTRIS AT THE KURIL ISLANDS, AND A TENTATIVE DETERMINATION OF THEIR RESPECTIVE NUMBER. Doklady Akad. Nauk SSSR 117(1): 153-156. 1957. [From J. Mamm. 39(3).]

In Russian with English summary.

Klumov, S. K. THE REGISTRATION OF THE COASTAL LYING PLACES OF EUMETOPIAS JUBATUS AT THE KURIL ISLANDS, AND A TENTATIVE DETERMINATION OF THEIR NUMBER. Doklady Akad. Nauk SSSR 117(2): 345-348. 1957. [From J. Mamm. 39(3).] In Russian with English summary.

Møhl-Hansen, U. INVESTIGATIONS ON REPRODUCTION AND GROWTH OF THE PORPOISE (PHOCAENA PHOCAENA (L.)) FROM THE BALTIC. Vidensk. Meddelelser Dansk Naturhist. Forening (Copenhagen) 116 (for 1954): 369-398, 2 pl. Feb. 1955. [From J. Mamm. 39(3).]

Pike, Gordon C., and Brian E. Maxwell. (Biol. Sta., Nanaimo, B. C.) THE ABUNDANCE AND DISTRIBUTION OF THE NORTHERN SEA LION (EUMETOPIAS JUBATA) ON THE COAST OF BRITISH COLUMBIA. J. Fish. Res. Bd. Can. 15(1): 5-17, illus., map. 1958. [From long authors' abstract in Biol. Abs. 32(9).]

"...Most major rookeries and hauling-out sites were visited in 1956. Some which were missed were surveyed by aircraft in 1957. The number of sea lions in British Columbia was estimated to be 11,000-12,000 in 1956-1957. They have apparently changed little since 1913 and 1916 when the population was estimated less reliably to have been 12,000-13,000. Some changes have occurred in their distribution, mainly as a result of organized destruction of concentrations centered near fishing areas... Destruction of approximately 1000 sea lions annually, when many of these are pups is shown to be ineffective in substantially reducing the total population. Where efforts are concentrated in one area such as the Sea Otter group, however, a local population can be greatly reduced and pupping curtailed or stopped. Pups are born from late May until late June. Soon after giving birth, cows are serviced by harem bulls. The harem structure, which averages about 10 cows per harem bull on the rookeries, begins to disintegrate near the end of July when pups take to water and dominant bulls are replaced by reserve bulls. Some cows, probably not more than 25% at any one time, may forgo normal annual pregnancy and continue to nurse a pup for more than a year. It is calculated that more than 70% of sexually mature females in this population are pregnant in any one year. Natural mortality among pups appears to be slight, but severe storms in some years may cause heavy pup mortality and constitute an important check on population growth."--Authors.

Wilke, Ford, and A. J. Nicholson. (1585 E. 175th St., Seattle 55, Wash.) FOOD OF PORPOISES IN WATERS OFF JAPAN. J. Mamm. 39(3): 441-443. Aug. 1958.

Report on stomach contents of 86 True Porpoises and 7 Dall Porpoises. Authors conclude that these species are not likely to cause noteworthy damage to commercial fisheries.

## MAMMALS--OTHER GROUPS

Burns, R. K., and Lucille M. Burns. (Carnegie Inst., Balt. 5, Md.) OBSERVATIONS ON THE BREEDING OF THE AMERICAN OPOSSUM IN FLORIDA. Rev. Suisse Zool. 64(32): 595-605. Dec. 1957. [From J. Mamm. 39(3).]

Lowrance, E. W. (U. Mo. Sch. Med., Columbia.) CORRELATIONS OF CERTAIN PONDERAL AND LINEAR SKELETAL MEASUREMENTS WITH SKULL WEIGHT AND SKULL LENGTH IN THE OPOSSUM. Anat. Record 128(1): 69-76. May 1957. [From J. Mamm. 39(3).]

McKeever, Sturgis. (U. Calif., Davis.) REPRODUCTION IN THE OPOSSUM IN SOUTHWESTERN GEORGIA AND NORTHWESTERN FLORIDA. J. Wildl. Mgt. 22(3): 303. July 1958.

Examination of young in marsupia of 143 ?? taken in 1956 and 1957 indicated that mating occurred during 2 periods. The first began in second week of Jan. and ended in the first week of March. The second began in first week of April and ended the second week of June. Young were found in marsupia from Feb. 16 to July 25. Number of young per litter av. 7.1 (s.e. = 0.18), with a range of 1 to 11 for 143 litters.--E. W. Jameson, Jr.

BIRDS--GENERAL

Gray, Annie P. BIRD HYBRIDS. A CHECK-LIST WITH BIBLIOGRAPHY. Commonwealth Agr. Bur., Farnham Royal, Bucks., Eng. x + 390 p. 1958. 50s. [From Biol. Abs. 32(9). No abstract.]

Hunt, L. Barrie. (203 S. 16th St., Richmond, Ind.) A STUDY OF TRAP PREFERENCE. Inland Bird-Banding News 29(6): 49-51, illus. 1957. [From Biol. Abs. 32(8).]
A graph shows preference among 4 types of traps by the total number of birds banded (3,319) and by 12 groups of species of birds.--R. W. Dexter.

Poulding, R. H. LOSS OF RINGS BY MARKED HERRING GULLS. Bird Study 1(2): 37-40. June 1954.

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Hitchcock, W. B., and R. Carrick. (Wildl. Surv. Sec., C.S.I.R.O., Canberra.) FIRST REPORT OF BANDED BIRDS MIGRATING BETWEEN AUSTRALIA AND OTHER PARTS OF THE WORLD. C.S.I.R.O. Wildl. Res. 3(1): 54-70, 3 figs. July 1958.
"This series of intermittent reports is complementary to the annual reports of the Australian Bird-banding Scheme. The migratory status of Australian birds is briefly reviewed, and the evidence from banded birds is given in detail."

Hurst, R. O., A. Kuksis, and J. F. Bendell. (Queen's U., Kingston, Ont.) THE SEPARATION OF OESTROGENS FROM AVIAN DROPPINGS. Can. J. Biochem. & Physiol. 35: 637-640. 1957.
This study was begun to find out if sex and breeding condition of wild birds could be ascertained from their droppings. Work reported here compared only droppings of breeding ♂ and ♀ chickens. Positive results were obtained. Abstract: "Excretion of oestriol and oestrone by the hen and of oestriol, oestrone, and oestradiol by the rooster is indicated by chromatographic analyses and color tests on the neutral and phenolic steroid fractions of extracts of the droppings of sexually active domestic fowl. No evidence for the excretion of androgens was obtained. An unknown component of the neutral fraction reacted with ethanolic potassium hydroxide to produce a pink color and was found only in the extracts of droppings from the male fowl."

Lack, David. (Ed. Gray Inst., Oxford, Eng.) MIGRATIONAL DRIFT OF BIRDS PLOTTED BY RADAR. Nature 182(4630): 221-223. July 26, 1958.

Miskimen, Mildred Althea. THE INFLUENCE OF SOCIAL AND PHYSICAL FACTORS ON AUTUMN BIRD MIGRATION. Ph.D. thesis, Ohio State U. 99 p. 1952. [From abstract in Dissertation Abstracts 18(6).]
An effort to correlate daily counts of migrating Myrtle Warblers at Chicago with 11 weather variables gave no correlation coefficients consistently high enough to be significant. In 1951, a field study was made of flocking behavior of several kinds of migrating birds. Individual flocks were recognized by peculiarities of behavior. Migrating flocks were well organized and had more activity and more concerted action than non-migrating flocks. "Uniformity of action seemed to be brought about chiefly by means of social facilitation, larger flocks and flocks longer in existence having the stronger reactions. Flocking reactions were strengthened by vocalization, by unified swimming and flight displays, and probably by other activities. ...for each species studied there was a certain range of light intensity through which flocking reactions were most intense; there were differences in behavior on clear or partly clear days as compared with days of complete overcast; strong winds, precipitation, and the presence of predators all served to intensify flocking reactions. ...a drop in temperature attendant upon frontal passage did not stimulate migration, but cloudy, stormy weather preceding a front facilitated flock organization by inducing closer association among the birds. No migrations were seen during cloudy weather before a front passed, but they regularly took place immediately afterward, as well as at other times when there was clear sky and flocks were well organized... In all cases birds migrated when flocks were well organized and flocking reactions were strong."

Norris, Robert A., and David W. Johnston. (1918 Hahn Ave., Aiken, S. C.) WEIGHTS AND WEIGHT VARIATIONS IN SUMMER BIRDS FROM GEORGIA AND SOUTH CAROLINA. Wilson Bul. 70(2): 114-129. June 1958.

Statistical data are presented on weights of 576 birds of 97 species. Weights are reported separately for ♀♀ and ♂♂, adults and immatures. Degree of fatness and time of collection are also indicated. In 4 species, ♂♂ are significantly heavier than ♀♀, but in 4 others there is no significant difference. In comparing weights of ♂♂ and ♀♀, the means of the samples must differ by at least 7% of weight of ♂♂ for the difference to be considered significant; or the difference must have a P-value no greater than 0.1. Young-of-year are more variable in weight than adults and they tend to weigh a little more than adults. Weights of 7 species studied are lower in the Ga.-S. C. area than in n. U. S.; this tends to support Bergmann's rule. An exception is the Rufous-sided Towhee, which is heavier in the local sample than in the N.; this may reflect the hybrid origin of the s. population.

Perdeck, A. C. SEVERAL EXPERIMENTS ON THE ORIENTATION OF BIRDS. Arch. Neerland. Zool. 11(4): 532. 1956. [From Biol. Abs. 32(8). No abstract.] In French.

Rood, K. G., R. K. Ringer, E. W. Speckmann, and L. F. Wolterink. (Mich. State U., E. Lansing.) THE EFFECT OF FEEDING RESERPINE TO GROWING BIRDS. Quart. Bul., Mich. Agr. Exp. Sta. 41(1): 157-162. Aug. 1958.

These trials were made with White Rock cross female chicks, but reserpine is being used by others on pheasants. Summary: "Under the conditions of this experiment and with the particular birds used in this study, the feeding of reserpine or phenobarbital at the given levels showed no significant differences on hemodynamics, radiophosphorus uptake, specific organ weights, comb, and abdominal fat weight, and gonadotrophin content of the pituitary. An increased ovarian weight was found at 56 days of age but disappeared at 77 days in the group fed 1.0 p.p.m. of reserpine. However, no other significant difference was found in any specific organ weight."

Schmidt-Nielsen, Knut, and Ragnar Fange. (Duke U., Durham, N. C.) THE FUNCTION OF THE SALT GLAND IN THE BROWN PELICAN. Auk 75(3): 282-289, 1 fig. July 1958.

Summary: "The salt gland (nasal gland) of the Brown Pelican can excrete a highly concentrated solution of sodium chloride. The excretory capacity of the salt gland permits the bird to tolerate ingestion of sea water, and to profit from it because the salt is excreted in a concentration higher than in sea water. Quantitatively, the role of the salt gland in the elimination of sodium chloride is greater than that of the kidney." This paper and others cited in it indicate that this mechanism is a general adaptation of sea birds and that the gland makes life at sea possible.

Schultz, Vincent. (U. Md., College Park.) A SELECTED BIBLIOGRAPHY ON VITAMIN A IN THE NUTRITION OF GAME BIRDS. Md. Agr. Exp. Sta. (College Park), Misc. Publ. no. 334, Contrib. no. 2960. 3 p., mimeo. 1958.

39 titles are listed, 13 of which are by R. B. Nestler and coauthors.

Sutter, Ernst. (Naturhist. Mus., Basel, Switz.) RADAR-BEOBACHTUNGEN ÜBER DEN VERLAUF DES NÄCHTLICHEN VOGELZUGES. Rev. Suisse Zool. 64(17): 294-303, 4 figs. June 1957.

Sutter, Ernst. (Naturhist. Mus., Basel, Switz.) RADAR ALS HILFSMITTEL DER VOGELZUGFORSCHUNG. Ornith. Beob. 54(3/4): 70-96, 21 figs. July 1957.

Threadgold, L. T. (U. of W. Ont., London, Ont.) PHOTOPERIODIC RESPONSE OF THE HOUSE SPARROW, PASSER DOMESTICUS. Nature 182(4632): 407-408, 2 figs. Aug. 9, 1958.

BIRDS--MANUALS, FAUNAS, COMMUNITIES

Batts, H. Lewis, Jr. (Kalamazoo Coll., Kalamazoo, Mich.) THE DISTRIBUTION AND POPULATION OF NESTING BIRDS ON A FARM IN SOUTHERN MICHIGAN. Jack-Pine Warbler 36(3): 131-149, 6 figs. Sept. 1958.

Describes major habitats and gives annotated list of birds. Annotations provide data on numbers, nesting, arrival and departure dates, and relationships (predation etc.) with other animals.

Bennett, Esther V. NESTING BIRDS OF THE SHORELINE AND ISLANDS OF CRAB ORCHARD LAKE, ILLINOIS. Trans. Ill. State Acad. Sci. 50: 259-264. 1957.

Based on "Nesting birds of Crab Orchard Lake," M.S. thesis, S. Ill. U., 45 p., 1953.

Harper, Francis. (115 Ridgway St., Mt. Holly, N. J.) BIRDS OF THE UNGAVA PENINSULA. U. Kans. Mus. Nat. Hist., Misc. Publ. no. 17. 171 p., 6 pl., 26 figs. Oct. 1958. $2.00, paper, from Arctic Inst., 1530 P St. NW., Wash. 5, D. C.

Francis Harper is one of the trail-blazing naturalists of Am., and the North Country has long been one of his specialties. This report on Ungava birds is based chiefly on observations in the central and s. portions of the peninsula, but includes distributional data for all Ungava for some species. Harper's investigations were made from May 20 to Oct. 13, 1953. "My particular object has been to indicate the relation of the records obtained in 1953 to the general distributional picture of each species in the peninsula." Introductory sections tell of previous work in the region, provide a list of localities, discuss life zones of region, and tabulate life-zone distribution of birds. Species accounts are based on species personally observed, or on which information was secured from sources other than published literature. About 100 species are treated. For these, notes are given on local names, biological observations, and localities. There are lengthy accounts of Spruce Grouse and Labrador Jay. Harper's habitat photos are excellent. His book has a good index and a bibliography of 11 p. Data in this volume will provide valuable additions to Todd's comprehensive work on the birds of Ungava, which has been in preparation for many years, and which we hope will be published soon.--Brooke Meanley.

Rausch, Robert. (Arctic Health Res. Center, Anchorage, Alaska.) THE OCCURRENCE AND DISTRIBUTION OF BIRDS ON MIDDLETON ISLAND, ALASKA. Condor 60(4): 227-242. 6 figs. July 1958.

BIRDS--ECONOMICS, CONTROL, MORTALITY

Abbott, Herschel G. (U. Mass., Amherst.) APPLICATION OF AVIAN REPELLENTS TO EASTERN WHITE PINE SEED. J. Wildl. Mgt. 22(3): 304-306. July 1958.

Four materials, anthraquinone, Morkit, quinizarine, and Arasan Seed Disinfectant and Protectant (50% tetramethyl thiuram disulphide) were all found to be effective as bird repellents when applied to E. White Pine (Pinus strobus) seed planted in nursery seedbeds. No statistical difference in relative effectiveness of repellents was determined. Repellency of materials was best demonstrated against Grackles (Quiscalus quiscala). Feeder tests of unplanted white pine seed treated with the same materials gave less positive results. Chipping Sparrows (Spizella passerina) and House Sparrows (Passer domesticus) eventually fed as freely on treated as on untreated seed.--Author.

Beck, John R. (US F&WS, Columbus, Ohio.) PRIMARY AND SECONDARY BIRD ROOST PREFERENCES. Pest Control 26(7): 18. July 1958.

Pertains chiefly to starlings in towns. Primary roosts tend to be dark buildings that have many ledges or projections. Often the building is taller than surrounding ones, is set off by itself a bit, and is near the center of the business district. An old-style courthouse is a good example. Repellents and frightening devices keep birds from primary roosts for relatively short periods; the length of time depends on how many other good roosts exist in the vicinity. Secondary roosts tend to be flat-roofed buildings with ledges, lighted sides are often used, buildings are same height as or taller than surrounding ones, buildings may be out of business district, and may have primary roosts nearby. On secondary roosts, repellents may work for 6 months to 2 years or more; frightening devices are usually effective if their use is continued. A minor roost sometimes can be handled satisfactorily by eliminating roosting sites.

Fitzwater, Wm. D. (US F&WS, W. Lafayette, Ind.) TEST PATTERN FOR BIRD CONTROL: LOGANSPORT, INDIANA. Pest Control 26(7): 9-10, 12, 14-16, 4 figs. July 1958.

The small city of Logansport had a sparrow and starling problem in the business district. A 5-day, cooperative control program was tried. Among the tools used were a bait of cracked corn and whole wheat poisoned with strychnine and placed on roof-tops and window ledges, roman candles, shell-crackers, mechanical exploders, and shotguns. Frightening devices were used chiefly on concentrations of birds. Some of the exploders were mounted on cars and moved from place to place as needed. Poisoning killed many sparrows but no starlings; the dead birds aroused public protest. Five days after operations, about 90% of the birds were out of the area. Six weeks later, this figure was down to 44%. The paper reports in detail on methods, costs, and results. It also suggests improvements in techniques.

Hockenyos, George L. (Sentinel Lab., Springfield, Ill.) BIRD REPELLENT COMPOSITIONS / AND THEIR MODIFICATION FOR USE AS ANIMAL & INSECT ENTANGLANTS. Natl. Pest Control Assn. (250 W. Jersey St., Elizabeth, N. J.), Tech. Rel. no. 8-58. 1-23 p., mimeo. May 1958. $2.00.

This paper is of special value, for there are almost no publications or patents in its field. Here, however, one learns of a wide range of modern chemicals that are used in entanglants, where to get these chemicals, how to prepare 47 jelly-type formulations, how to prepare 6 spray formulas for bird repellent compositions, how to prepare 3 bird-repellent creams, and how to apply these formulations. All the preparations depend on tackiness to repel or hold animals. Data are based on the author's extensive studies of the subject.

Mossman, Archie S. (U. Wyo., Laramie.) SELECTIVE PREDATION OF GLAUCOUS-WINGED GULLS UPON ADULT RED SALMON. Ecology 39(3): 482-486, 4 photos. July 1958.

Summary: "Glaucous-winged gulls killed proportionately many more female than male red salmon in two spawning streams in Alaska. In addition, the gulls were much more likely to eviscerate the females than the males. The mechanisms that may enable gulls to selectively kill the females, and those that may permit the salmon to maintain strong sexual dimorphism in the face of such stringent selection, are discussed. The tentative conclusion reached is that the characters of the salmon that result in this selective predation are ones that cannot be dispensed with by the female salmon and cannot now, in the face of this strong selection, be attained by the male."

## BIRDS--PARASITES AND DISEASES

Ash, J. S. POST-MORTEM EXAMINATIONS OF BIRDS FOUND DEAD DURING THE COLD SPELLS OF 1954 AND 1956. Bird Study 4(3): 159-166. Sept. 1957.

Summary: "1. The probable causes of death of birds found in the cold spells of 1954 and 1956 are listed and discussed. 2. In 1954 nine birds were examined, of which three were diseased, two heavily parasitised, and two injured. 3. In 1956 29 birds were examined, of which 27 were parasitised (some heavily). 4. Body weights were extremely low, ranging from 20 to 54% below 'normal' weights. 5. Many more females than males (21:9) were found dead."

Bearup, A. J. (Sch. Pub. Health Trop. Med., Sydney.) SCHISTOSOMES IN THE NASAL PASSAGES OF AQUATIC BIRDS. Australian J. Sci. 19(4): 163. 1957. [From Biol. Abs. 32(8). No abstract.]

Lake, F. B. TREATMENT OF SICK AND WOUNDED BIRDS. Bird Study 5(2): 66-74. June 1958.

Summary: "1. The problem of the exhausted, sick, or injured bird is discussed, mostly with regard to the small passerines, with brief notes on other types of birds. 2. Elementary principles of cage and aviary management of such cases are described, stressing the necessity of a period of rehabilitation before release. 3. Some common treatable illnesses and injuries are described. 4. The problem of when and how to destroy ill birds is considered."

Potemkina, V. A. ECHIUROID INFESTATION OF AQUATIC BIRDS. Ptitsevodstvo 1955(12): 28-30. 1955. [From Biol. Abs. 32(7); from Referat. Zhur., Biol., 1956, No. 84242.]
In Russian. No abstract.

Reis, J., P. Nobrega, A. S. Reis, R. C. Bueno, and M. Giovannoni. DISEASES OF BIRDS [Tratado de Doencas das Aves]. Second edition. Edicoes Melhoramentos, Sao Paulo, Brasil. Vol. 1, 391 p. Vol. 2, 416 p. Vol. 3, 318 p. Vol. 4, 428 p. [1957?] Price not stated. [From review by C. A. Wright, Nature, June 28, 1958.]
"To undertake the compilation of a comprehensive work on a subject so enormous and ramifying as the diseases of birds requires courage. To complete such a work and present it in a manner that makes it of the greatest use, to both veterinary practitioners and students, is an achievement that does credit to the painstaking care and ability of the authors... The work was originally published in four volumes but in the new edition Vols. 1 and 2 and Vols. 3 and 4 are bound together to form two books only. It is natural that the main bias of the work is toward the diseases of domestic poultry since it is in this field that the majority of work has been carried out, but information on matters of academic interest concerning wild birds is also included. The bibliography has been brought up to 1952 and, in some cases, more recent references are included. This fact alone will make the work useful even to those unable to read the Portuguese text. The diseases are classified under their causative organisms. Thus, Part 1 is concerned with virus diseases, Part 2 with bacterial and fungal infections, Part 3 with diseases caused by Protozoa and parasitic arthropods and the last part deals with helminths and nutritional disorders. In Part 4, there are also sections on the pathological lesions of the organ systems, poisons, abnormalities of development, hygiene and a brief summary of surgical and general therapeutic measures." The rest of Wright's review discusses the arrangement of subject matter in the 4 major sections of the work.

## QUAIL

Edwards, Wm. R. A GUIDE TO AGEING COTURNIX EMBRYOS. Ohio Dept. Nat. Resources, Div. Wildl., Olentangy Wildl. Exp. Sta., R.F.D. 2, Delaware, Ohio. 7 p., 12 figs., mimeo. Dec. 1957.
Lists key characters for days 1 through 16 and provides drawings of embryos of from 4 to 15 days.

McGrew, Dan. (Nebr. Game Comm.) ALL ABOUT COTURNIX. Outdoor Nebr. 36(9): 17-19, 5 photos. Sept. 1958.
A summary, based largely on a compilation by David Wetherbee, of what is known about the life history, habits, and ecology of coturnix quail.

Robinson, T. S. (W. Mich. Coll., Kalamazoo.) CLIMATE AND BOBWHITES IN KANSAS IN 1956. Trans. Kans. Acad. Sci. 60(3): 283-287. 1957. [From Auk 75(3).]

## PHEASANTS

I.C.I. Game Services. PHEASANT EGG PRODUCTION / AND SOME SUGGESTIONS FOR RESTOCKING. I.C.I. Game Res. Sta. (Fordingbridge, Hampshire, Eng.), Advisory Booklet no. 5. 1-24 p., 12 figs. 1954, revised Spring 1958.
Tells how to trap pheasants for brood stock, how to make laying pens of several sorts, how to manage the laying birds, how to feed laying birds, and how to control egg eating.

I.C.I. Game Services. SOME NOTES ON PHEASANT REARING. I.C.I. Game Res. Sta. (Fordingbridge, Hampshire, Eng.), Advisory Booklet no. 8. 1-46 p., illus. 1952, revised Spring 1958.
Much helpful information on rearing young pheasants under British conditions. Describes construction and use of movable pens, use of artificial brooders or bantam foster mothers, feeding, food consumption, growth rate, control of feather picking, and release of pen-reared young to coverts.

I.C.I. Game Services. HATCHING GAME BIRDS' EGGS. I.C.I. Game Res. Sta. (Fordingbridge, Hampshire, Eng.), Advisory Booklet no. 11. 1-27 p., illus. 1936, revised Spring 1958.

Much helpful, practical information on hatching pheasant eggs. The 2 major systems, use of artificial incubation and use of brood bantams, are both discussed in detail. Data are also given on fertility, hatchability, and storing and setting eggs. Many of the problems that arise are considered.

I.C.I. Game Services. YOUR YEAR'S WORK (1957) / AN ANNUAL REPORT OF WORK DONE BY SCIENTISTS AND GAMEKEEPERS ON THE I.C.I. EXPERIMENTAL ESTATE. I.C.I. Game Res. Sta., Fordingbridge, Hampshire, Eng. 1-54 p., illus. 1958?

A diversified booklet that gives a great deal of miscellaneous information on rearing and managing Pheasants and Partridges (Gray and Red-legged) under British conditions. Workers concerned with artificial propagation and productivity of these birds will find the report of special interest.

Janson, Victor S. (Mich. Dept. Cons.) ARE WE WASTING PHEASANTS? Mich. Cons. 27(5): 2-7, 4 figs. Sept.-Oct. 1958.

Mich. could have a 35-day season rather than a 22-day season, and without hurting the population. The state also could allow shooting of hens in good years in areas of high abundance and crop damage. Both moves would require legislation.

Robertson, Wm. B., Jr. INVESTIGATIONS OF RING-NECKED PHEASANTS IN ILLINOIS. Ill. Dept. Cons., Div. Game Mgt., Tech. Bul. no. 1. v + 137 p., 27 figs. July 1958. Single copies free on request to Ill. Dept. Cons., Springfield.

Important monograph based on work of several biologists; has an abundance of well-documented comparative data. Valuable information is given on the following and other subjects: introductions and history in Ill.; range in Ill.; land use in relation to pheasants; weather and crop phenology, 1946-51; winter behavior; winter trapping; seasonal weight changes; age-class determination; winter age ratios of hens; dispersal of winter flocks; territorial behavior; census; spring sex ratios; nesting cover and mortality; relation of nesting to weather and farming; late nesting; flushing-bar studies; brood size; relation of weather and crop phenology to hunting; hunting results; seasonal distribution of kill; proportion of cocks shot; age ratios of kill; results of questionnaire surveys of hunters; results of game-farm releases; population trends, 1946-51; factors limiting range of pheasant in Ill. Some of the more significant findings, as pointed out by Thomas G. Scott, are: In east-central Ill. near s. edge of range, birds wintered in small groups and were little dependent on heavy cover; in n. Ill., they wintered in larger flocks and were more dependent on heavy cover. Sex segregation in winter flocks was not commonly seen. Of marked birds released, adult ?? were in harems sooner than young, which suggests that adults were sexually active at earlier dates. Break-up of winter flocks and start of nesting seemed more correlated with weather than indicated by other studies. Curves of hatching dates were analyzed for effects of photoperiod, weather, and farming; destruction of nests by mowing was major factor causing irregularity of curves. Late hatches occurred in 1950 and 1951; when hunting season opened Nov. 11, 15-17% of pheasants were unmolted young hatched after Aug. 15; probable cause was cool, late summer weather. Range in Ill. is believed to be limited both by effect of heat on eggs and by availability of calcium.

Westerskov, Kaj. (Wildl. Div., Dept. Internal Affairs, Wellington C. 1, N. Z.) GROWTH AND MOULT OF PHEASANT CHICKS. N. Z. Dept. Internal Affairs, Wildl. Publ. no. 47. 1-64 p., 12 figs., 6 pl. 1957 [Rec'd. Sept. 1958].

Detailed quantitative report that should be of great value in dating life-history events, especially in N. Z. Increase in weight of embryos and changes in eggs are treated thoroughly, with emphasis on ascertaining age. All plumages are described with reference to sex and age identification. Molt of primaries and tail feathers is described carefully. A table based on post-juvenile molt of primaries is supplied for dating nesting events. Further aid in age identification is given by studies on increase in length of wing, tail, track, spur, and culmen. Changes in weight from hatching to 24 or 26 weeks are graphed and discussed. Throughout, data from the literature are used comparatively.

Ammann, George A., and Walter L. Palmer. (Mich. Dept. Cons., Lansing.) RUFFED GROUSE INTRODUCTIONS ON MICHIGAN ISLANDS. J. Wildl. Mgt. 22(3): 322-325, 1 fig. July 1958.

Ruffed Grouse (Bonasa umbellus) were native on only 3 of Michigan's 8 largest islands. These 3 islands are less than 1 mi. from the mainland. The species was not native on the other 5 islands (which are 1 mi. or more from the mainland), probably because of the water barrier. Spruce Grouse (Canachites canadensis) are native, however, on 1 of these (Drummond Island). Ruffed Grouse were introduced successfully on 3 of the heretofore grouseless islands (Beaver, Bois Blanc and Drummond). Hunting was allowed after 6 breeding seasons. Populations reached high densities in about 5 years, in contrast to the cyclic decline elsewhere in the state during this period. Afterward they assumed lower, more normal densities.--G. A. Ammann.

Chambers, Robert E., and Ward M. Sharp. (W. Va. Cons. Comm., Elkins.) MOVEMENT AND DISPERSAL WITHIN A POPULATION OF RUFFED GROUSE. J. Wildl. Mgt. 22(3): 231-239, 2 figs. July 1958.

From June 1954 to May 1956, 128 grouse were banded on a study area in central Pa. These represented about half the population. Cruising radius of most broods in 1955 did not exceed 1/4 mi. Intermingling of broods occurred frequently. Dispersal began in mid-Sept. and reached peak in Oct. Data were obtained on random dispersal of 17 juveniles. 59% of these birds moved more than 1 mi. from point of capture. One moved 7.5 mi. Half of the juveniles were lost from the study area owing to egress in fall of 1955. Data on travels of 12 adults suggest that grouse, especially ♂♂, become sedentary after first mating season. Only 1 ♂, banded as adult, was found more than 1/4 mi. from banding site. Adult ♀♀ were known to move more than 1 mi.

Copelin, Farrell F. WELFARE STATUS OF THE LESSER PRAIRIE CHICKEN IN OKLAHOMA. M. S. thesis, Okla. State U. vi + 45 p. May 1958. [Copy in US Dept. Int. Library.]

Findings and conclusions: "The lesser prairie chicken still is widespread throughout western Oklahoma. It is known to occur in at least 12 contiguous counties. The density of this bird now appears low as compared with former known densities. In one area where the density was more than 37 males per square mile in 1932, the density was only 4.0 males per square mile in 1956 and 3.5 males per square mile in 1957. These low densities are coincident with a very severe drought, overgrazing, and a low phase in the grouse cycle. Except for overgrazing, land-use practices generally are becoming more favorable to the welfare of the lesser prairie chicken. The range it inhabits is not well suited to cultivation because its soils are either too sandy or too shallow for sustained productive tillage. The current trend is toward establishing more acres to permanent grassland." Number of young per brood was greater in year of luxuriant vegetative cover than in year when cover was sparse. The trend toward brush control is not favorable; preservation of patches of brush is desirable, especially within 1/2 mile of booming grounds, to provide shelter for young.

Eygenraam, J. A. (ITBON, Kemperbergerweg 11, Arnhem, Netherlands.) MANAGEMENT OF BLACK GROUSE. Z. Jagdwissensch. 3(2): 79-87. 1957.

In German with English summary. The black grouse (Lyrurus tetrix) has declined in Holland in recent years, presumably because of environmental changes, but not owing to predation. On the basis of stomach analyses, fecal analyses, and pellet counts in various habitats, the important foods and habitat requirements are described. Suggestions are given for burning or mowing heather to increase food and supply breeding, nesting, and roosting sites.--V. F. Flyger.

Fallis, A. M., and G. F. Bennett. (Ont. Res. Found., Toronto.) TRANSMISSION OF LEUCOCYTOZOON BONASAE CLARKE TO RUFFED GROUSE (BONASA UMBELLUS L.) BY THE BLACK FLIES SIMULIUM LATIPES MG. AND SIMULIUM AUREUM FRIES. Can. J. Zool. 36 (4): 533-539, 5 figs. Aug. 1958.

Abstract: "Specimens of Simulium aureum, S. latipes, S. venustum, and S. rugglesi feed on ruffed grouse although relatively few engorged specimens of the two latter species were obtained. S. aureum and S. latipes are suitable hosts for Leucocytozoon bonasae as shown by infections produced in grouse following injections of sporozoites removed from the salivary glands of these flies. The parasitaemia in grouse infected naturally and experimentally was relatively low and no gross signs of disease were noted in any of the infected birds."

Foote, James E. (Mich. Dept. Cons., Atlanta.) GREATER PRAIRIE CHICKEN DYING ON BOOMING GROUND. J. Wildl. Mgt. 22(3): 312. July 1958.
A ♂ dropped dead during a fight with another ♂. Occurrence of a second such event was suggested by finding a ♂ dead, but without obvious injury, on a booming ground. Vehement fighting is not uncommon during courtship of Prairie Chickens and Sharp-tailed Grouse.

Hoffmann, Robert S. (Mont. St. U., Missoula.) THE ROLE OF PREDATORS IN "CYCLIC" DECLINES OF GROUSE POPULATIONS. J. Wildl. Mgt. 22(3): 317-319. July 1958.
Certain authors have suggested that abrupt declines in density of grouse populations may be attributed to excessive predation, resulting from a decline of the predator's usual prey (lagomorphs, rodents). This hypothesis is not supported by observed instances in which grouse populations declined in advance of the decline in lagomorph or rodent populations in the same area.--Author.

I.C.I. Game Services. PARTRIDGE REARING--WINTERING PENNED STOCK, MATING IN CAPTIVITY, AND EGG PRODUCTION. I.C.I. Game Res. Sta. (Fordingbridge, Hampshire, Eng.), Interim Notes no. 4. ii + 21 p., illus. 1952, revised Spring 1957.
Much helpful detail on how to propagate Perdix by use of bantam foster mothers. Discusses collection of eggs in field, selection of bantams, use of coops and movable pens, feeding formulas and techniques, results that have been experienced, methods of releasing, care of captives in winter, and mating of captives.

Müller-Using, D. EINIGE BEOBACHTUNGEN UND FESTELLUNGEN BEIM ALPENSCHNEEHUHN (LAGOPUS MUTUS HELVETICUS THIENEMANN). Ornith. Mitt. 10(3): 46-50. 1958. [From Auk 75(3).]
In German. "Observations on the Alpine Rock Ptarmigan, regarding weights, food, calls, courtship."

## TURKEY

Allen, Ralph H., Jr. (Ala. Dept. Cons.) IS A SPRING GOBBLING SEASON BIOLOGICALLY SOUND? Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 124-126. 1956 (1957).
Evidence that Alabama's spring hunting season for turkeys is biologically sound. For summary, see WR 88: 70.

## DOVES AND PIGEONS

Goodwin, Derek. (Brit. Mus. Nat. Hist., London S.W. 7, Eng.) REMARKS ON THE TAXONOMY OF SOME AMERICAN DOVES. Auk 75(3): 330-334. July 1958.
The generic name of our Mourning Dove becomes Zenaida rather than Zenaidura if Goodwin's proposals are adopted. Goodwin argues for merging the genera Zenaidura, Melopelia, and Nesopelia in Zenaida, which is the genus of the White-winged Dove. Other changes suggested in this paper are of less interest to U. S. wildlife biologists.

Harris, Stanley W., and Marius A. Morse. (Minn. Div. Game, St. Paul.) THE USE OF MIST NETS FOR CAPTURING NESTING MOURNING DOVES. J. Wildl. Mgt. 22(3): 306-309, 1 fig. July 1958.
Describes a technique for capturing adult Mourning Doves at dense-cover nesting sites. Fifty-one captures were made of 37 ♀♀ and 5 ♂♂ at 38 nest sites in 25 hours. Usually, a 3-man crew was used with a moving net. Problems of handling net, approaching nests, 1-man operation of stationary set, and limitations are described.--Authors.

Adams, Arthur W. (N. Dak. Game Dept.) HALF-DAY SEASON IMPROVES GOOSE HUNTING. N. Dak. Outdoors 20(13): 4-5, 17, 2 figs. July 1958.

In certain areas, N. Dak. made it legal to shoot geese only in the morning. 92% of hunters believed that this improved their hunting. Landowners favored it because it reduced trouble with hunters.

Anon. DISTRIBUTION AND STATUS OF WATERFOWL IN THE MISSOURI RIVER BASIN. US F&WS, Mo. River Basin Studies, Billings, Mont. vi + 136 p., 41 maps, 14 figs. May 1957.

The first 42 p. of this report give a good picture of conditions for waterfowl in the basin. They discuss amounts and types of habitat, favorable and unfavorable factors, present refuge areas, distribution and populations of waterfowl at different seasons of the year, migration times and routes, general results of banding, size and distribution of kills. Seven tables and 6 maps assist in presenting data for individual states and species. The second part of the paper takes up the birds by species, including coot, rails, snipe, etc. Maps show breeding and wintering ranges in the basin, or migration routes and concentration areas. Text, usually 1 page per species, states total breeding and wintering ranges, outlines migration pattern, summarizes nesting habits and foods in a few lines, discusses population trend and major limiting factors, and considers the economic, sporting, or esthetic importance of the species.

Atkinson-Willes, G. L. NATIONAL WILDFOWL COUNTS. FOURTH REPORT. Wildfowl Trust, Slimbridge, Gloucestershire, Eng. 1-20 p., 7 figs. + thumbnail sketches. 1957. 2s. 6d.

This 4th Report is devoted to a technical analysis of "Fluctuations in the winter population of Tufted Ducks in Great Britain." The 3 earlier reports, for 1947-52, 1952-54, and 1954-55, all by the same author, are also available from the Trust. They present the results of counts in different portions of Great Britain. The third report includes counts from several Eur. countries. The first contains a paper by Jeffrey G. Harrison, "The recent status and distribution of wild geese in north-west Germany."

Carter, Brian C. THE AMERICAN GOLDENEYE IN CENTRAL NEW BRUNSWICK. Can. Wildl. Serv. (Ottawa), Wildl. Mgt. Bul., Ser. 2, no. 9. iii + 47 p., 8 figs. 1958.

Detailed 5-year study of life history and behavior of Bucephala clangula. Peak of spring migration was in 3d week of April. Sex ratio during spring flight was 160 ♂♂ per 100 ♀♀. Drakes established waiting areas rather than true territories. Nests were in many kinds of cavities, some of which had surprisingly small openings. Size of av. complete clutch was 9. Unhatched eggs were 3.8% of all eggs found. Hatchlings spent first 5 weeks near nest, then moved to emergent vegetation along larger bodies of water. First broods appeared about 3d week of May; few were seen after 2d week of Aug. Size of av. brood dwindled with increasing age from 6.2 to 4.8. Reduction in av. brood size from age of 1 week to flight stage was 22.5%. Total loss to flight stage (50-65 days) was 47%. Birds remained on study area until driven out by ice, when they migrated s. and se. to coast. Goldeneyes constituted 19% of hunters' bags in central N. B. Of bagged birds, 32% were adults and 60% were ♂♂. Population peaked in 1947, declined to 1949, and recovered slightly in 1950. Annual productivity on study area was low: 1 goldeneye at flying age for every 43 acres of breeding habitat. Limiting factors were hunting, accidents, predation, and parasites. Suggestions for further studies are given.

Church, H. F. THE MUTE SWAN POPULATION OF THE EASTERN BORDERS. Bird Study 3(3): 212-217, 1 fig. Sept. 1956.

Summary: "1. Counts over four years of Mute Swans in the lower Tweed valley and on coastal flats adjoining suggest that there is a regular, seasonal movement between the two habitats, the coast being preferred in the winter. There are, however, discrepancies which may indicate that other haunts are occasionally used. 2. The large summer population which haunts the estuary is composed of non-breeding birds. 3. The percentage of cygnets in wintering flocks is of the order of 10-15 per cent. 4. The literature indicates that the Mute Swan has increased during this century in the Tweed area and counts of non-breeding birds along the river indicate a considerable change even in the last ten years."

Cronan, John M. (R. I. Div. Game, Providence 3.) SEX RATIOS OF WINTERING SCAUPS IN LONG ISLAND SOUND. Wilson Bul. 70(2): 191-192. June 1958.

Dillon, Olan W., Jr. (US Soil Cons. Serv., Rosenberg, Texas.) FOOD HABITS OF WILD DUCKS IN THE RICE-MARSH TRANSITION AREA OF LOUISIANA. Proc. 11th Ann. Conf. SE. Assn. Game & Fish Comms.: 114-119. 1957 (1958).

Stomach and gullet contents were studied from 9 Gadwalls, 155 Mallards, 18 Pintails, 7 Bluewing Teal, and 12 Greenwing Teal shot in fall in Cameron and Vermilion parishes, La. Results are tabulated and "choice" and "less attractive" foods are listed for each duck species named. Most important foods were domestic rice, brownseed paspalum, junglerice, and barnyardgrass. Wild marsh and aquatic plants, although common in areas where ducks were collected, were used relatively little. Apparently ducks were leaving marshes and flying 5-30 mi. or more to feed in rice fields. Earlier studies did not show so much use of rice-field plants. Rice fields, with their waste rice and abundance of weeds, produced more food than equal acreages of natural areas; the difference may become greater as natural areas deteriorate under commercial pressures. Agriculturally fed ducks are usually fat, but marsh-fed ducks are often in poor flesh by Feb. or Mar. It is relatively simple to manage a rice field for ducks. One need only hold 1 inch or a few inches of water on the field in late fall and winter. The necessary levees are already present and all that is needed is simple control of water level. One farmer who followed this practice, and allowed shooting only in morning, had 327 ducks shot over his 40-acre rice field in 1 split season of 50 days.

Fog, Jørgen. HAND-REARED MALLARDS (ANAS PLATYRHYNCHOS) MARKED DURING 1950-55. Danske Vildtundersøgelser, Hefte 8. 1-31 p., 1 graph. 1958.

In Danish with English summary and legends. In the period, 2,453 Mallards were reared and released in Denmark. Seventeen % returns were at hand by end of 1956 and are reported here. Rings gave 60% higher recovery than wing-tags. Seventy-seven % of recoveries were from within 5 km. of release point; this was true whether recoveries were within a year or more than a year. Like Danish wild Mallards, few (1.2% of recoveries) of the reared birds migrated in fall. Shooting caused 85% of recoveries. Among 385 recoveries, contributions of age classes 1-7 were: 228, 93, 35, 18, 7, 4, 0. Birds of an av. release disappeared within 5.5 years. Mean annual mortality of adults was calculated to be 59.2 ± 3.0%. In age classes 2-5, mortality was 59.2, 54.7, 62.1, and 63.6%. "In the first age class it is 59.2 per cent, i.e. not greater than among adults; this fact is probably a result of deliberately light cropping of newly released birds." Considering only shooting, first-year mortality was 64.5% and adult mortality was 64.7 ± 3.5%. Life expectancy of birds entering second year class was 1.19 years.

Gillham, Mary E. (The University, Exeter, Eng.) FEEDING HABITS AND SEASONAL MOVEMENTS OF MUTE SWANS ON TWO SOUTH DEVON ESTUARIES. Bird Study 3(3): 205-212, 2 figs. Sept. 1956.

Summary: "Grazing of estuarine salt marsh turf by Mute Swans has a considerable influence on the nature of the vegetation and this is being observed with the aid of swan-proof exclosures. Succulent plants and the semi-succulent salt marsh grass are most severely grazed. Feeding is wasteful, a great deal of vegetation being severed and left to wilt. Feeding preferences vary seasonally, this leading to local migrations from one area to another. Broadly speaking grazing of salt marsh turf occurs during April, May and June, the birds feeding on the Zostera beds of the lower Exe during late summer and autumn when the land vegetation has become coarser and less palatable with maturity. In winter the largest flocks are found on freshwater stretches of the rivers and, in the event of heavy rains, on freshwater marshes and flooded fields."

Hibbard, Edmund A. (Mus. Zool., U. Mich., Ann Arbor.) WOOD DUCK IN NORTH DAKOTA. Flicker 30(2): 42-46, 1 map. June 1958.

Summary: "The Wood Duck has been definitely established as a breeding species along several streams in eastern North Dakota and on the Souris River in north-central North Dakota. Observations also indicate that this duck may breed along several other eastern North Dakota streams that have the required habitat. Sight or botulism records from seven refuges in North Dakota and from various points in the treeless pothole portion of the state indicate that stray individuals, especially non-breeding males, may occur at any point in the state during the summer and fall months. Observations from the Missouri River area are meager but it appears doubtful if the species now breeds in this region."

Hughlett, Charles A. REFUGE FARMING AND CANADA GOOSE MANAGEMENT. M. S. thesis, U. Wis. ii + 24 p. 1957.--J. J. Hickey.

Hunt, George Sylvester. CAUSES OF MORTALITY AMONG DUCKS WINTERING ON THE LOWER DETROIT RIVER. Ph.D. thesis, U. Mich. 308 p. 1957. [From Dissertation Abstracts 18(6).]

Both ducks and duck foods were studied. Lead poisoning, aspergillosis, coccidiosis, helminthic infestation, phosphorus poisoning, pneumonia, injuries, proventriculitis, and neoplasms were, individually, minor causes of mortality. Together, however, they accounted for 30-35% of losses. Conditions that did not contribute to winter mortality were erysipelas, paratyphoid, algal poisoning, botulism, cholera, malaria-like diseases, and sarcosporidiosis. Oil pollution accounted for 9-33% of duck losses. Starvation began to appear in a week or 2 after 70-90% of food beds were covered with ice. Losses from this ranged from 37-56% of the total. All losses in the period 1948-56 varied from about 100 to 10,000 ducks per winter, or from less than 1% to 27% of the population. "Present food supplies should be at least maintained by guarding against dredging and filling of food producing shallows. Prevention of increased water turbidity will assist in maintenance. Greater food production would be possible if turbidity were reduced in the western part of the study area. A source of warm effluent on the east side of the Detroit River would prevent some ice formation and thus make more food available during critical periods. Frightening and herding ducks from the region by aircraft and other means, at the time of first critical ice formation, would reduce the pressure on available food supplies. Losses due to oil can be reduced if proper waste disposal is practiced."

Jahn, Laurence R., Ralph C. Hopkins, and Harold C. Jordahl. (Wis. Cons. Dept.) PROTECTION FOR WATERFOWL IN FALL. Wis. Cons. Bul. 23(9): 13-17, 1 map. Sept. 1958.

Wis. has established 41 areas that are closed to hunting and motor-boating in the fall. These areas now total 405,532 acres. They provide waterfowl with almost undisturbed feeding and resting places during hunting season and thereby hold birds in the region. The Cons. Comm. itself doesn't have the power to close all 41 areas, but works with organizations that control the areas. Guidelines for the selection of suitable areas are discussed. All of the 41 present areas are listed and several of them are discussed and figures on their value are given.

Klopman, Robert B. (Dept. Zool., Downing St., Cambridge, Eng.) THE NESTING OF THE CANADA GOOSE AT DOG LAKE, MANITOBA. Wilson Bul. 70(2): 168-183, 2 figs. June 1958.

Geese began nesting while lake was still frozen in 1954 and 1955. Start of nesting was about 13 days later and the season was shorter than reported from ne. Calif. Of the 104 nests, 94% were on islands, most of which were small. Breeding densities were high, up to 15 nests on 1/6 acre. Minimum distance between active nests was 9 yards. Earliest nests on islands were not as far apart as possible, and nearest-neighbor distance decreased as number of nests increased. Site selection apparently was influenced by social interactions between pairs. Nest success was 61% in 1954, 35% in 1955. Flooding caused more than half of nest failures. Predation and desertion together accounted for about 40% of nest failures. Main predators were foxes, gulls, and men. Desertion was caused mainly by friction with other species of nesting birds. Hatching period extended from May 28 to June 17 in 1954 and from May 15 to June 8 in 1955. Mean clutch size was 5.0 ± 2.5 eggs in 1954, 5.2 ± 2.5 in 1955. Number of young per successful nest increased from 4.8 to 5.5, but number of young believed to have left nests dropped from 129 to 115.

Kuroda, N. (Fukuyoshi Cho, Akasaka, Tokyo.) MISCELLANEOUS NOTES ON ANATIDAE PUBLISHED SINCE 1938. Tori 14(67) p. 1-14; 14(68) p. 1-14; 14(69) p. 1-12. 1956-57. [From Auk 75(3).]

"A useful annotated bibliography of papers on the Anatidae published between 1939-1956. In Japanese, but literature references are given in the original languages; technical names of species treated and localities are also in Latin type."

Lebret, T. (Waterwild-Subcommissie, Park de Griffioen 17, Middelburg, Nederland.) INCITING ("HETZEN") BY FLYING DUCKS. Ardea 46(1/2): 73-75, 1 fig. 1958.
Brief discussion, in English, of a type of courtship display that is important in Mallards and other dabblers.

Lebret, T. (Waterwild-Subcommissie, Park de Griffioen 17, Middelburg, Nederland.) THE "JUMP-FLIGHT" OF THE MALLARD, ANAS PLATYRHYNCHOS L., THE TEAL, ANAS CRECCA L. AND THE SHOVELER, SPATULA CLYPEATA L. Ardea 46(1/2): 68-72, 3 figs. 1958.
In English. Describes a type of display performed by drakes.

Lemieux, Louis. TAXONOMY OF THE WHITE GEESE. Naturaliste Canadien 83(4): 61-65, illus. 1956. [From Biol. Abs. 32(8). No abstract.]
In French.

McEwen, Eoin H. (Can. Wildl. Serv., Ottawa.) OBSERVATIONS ON THE LESSER SNOW GOOSE NESTING GROUNDS, EGG RIVER, BANKS ISLAND. Can. Field-Nat. 72(3): 122-127. July-Sept. 1958.
Discusses migration, nesting success, mortality factors, and numbers. Spring migration occurred May 17 to June 4 in 1955. Data are given on migration routes. The Egg R. nesting grounds occupies an area of 10-12 sq. mi. Clutch size in 920 nests varied from 2 to 9 and av. 3.88. Hatching began June 27. In the period between June 28 and July 3, av. brood size decreased from 3.43 to 3.28. Geese dispersed from the nesting area soon after hatching. Mortality factors observed were severe weather and predation by various animals. Predation on eggs is described for Arctic Fox and Long-tailed Jaeger. Parent geese successfully defended their own eggs against foxes but did not attempt to protect nests of other individuals. Nesting population at Egg R. totaled about 41,000 and that of Banks Is. about 50,000. Production of young on the island would be about 60,000. Knowledge of autumn migration is summarized.

Murray, Lucy H. (Regina, Sask., Can.) THE BLACK DUCK IN SASKATCHEWAN. Blue Jay 16(3): 109-111. Sept. 1958.
Documented discussion of the scattered records of occurrence.

Olson, Sigurd T. (Apt. 13, 1101 Sixth, Fairbanks, Alaska.) GULL-WATERFOWL RELATIONSHIPS ON THE WATERFOWL BREEDING GROUNDS IN ALASKA. Sci. in Alaska 1954. p. 38-39. 1957.
Abstract only. "Of the many species of gulls found on the breeding grounds of waterfowl in Alaska, only the Glaucous and possibly the Glaucous-winged gulls have any real significance as a limiting factor on waterfowl production. Short-billed gulls which are also recognized as predators are relatively unimportant in this respect. Although these three species are found on the waterfowl breeding grounds throughout Alaska, their depredations have been serious only on the Yukon delta. To date, it has not been possible to evaluate the degree to which the annual waterfowl production has been affected. Further studies will be necessary to determine the extent of losses and the necessary methods for control."

O'Meara, David Charles. BLOOD PARASITES IN MAINE WATERFOWL, ESPECIALLY LEUCOCYTOZOON SPP. M. S. thesis, U. Maine. iv + 78 p., 14 figs. June 1954. [Copy in US Dept. Int. Library.]
For related publications by author see WR 86 p. 80 and 91 p. 102.

Robinson, Richard H. (Monterey Peninsula Coll., Monterey, Calif.) USE OF NEST BOXES BY WOOD DUCKS IN THE SAN JOAQUIN VALLEY, CALIF. Condor 60(4): 256-257. July 1958.
The San Joaquin Valley is the southernmost extension of the w. breeding range. There trees along rivers are being removed at an increasing rate to make way for agricultural expansion. A total of 39 nest boxes was tried in different areas. All successful nests were in wooded areas, over or close to open water and easily visible from the water. No boxes were used if on marshes or vegetation-choked waters. Nesting period was from last week of March to first of Aug.; perhaps it was lengthened by renesting. Eggs were small (av. 46.8 mm. x 37.4 mm.) relative to others from Calif. or the East. There were 14 nestings in the 39 boxes in

1954. Normal nests av. 8.5 eggs per clutch and 82.6% of eggs hatched. Dump nests, all too common, av. 20.2 eggs, of which only 55.9% hatched. The frequency of dump nesting, and the use of squirrel nests and buildings for wood-duck nest sites, was evidence of critical lack of nest sites in certain areas. Provision of more nest boxes in the San Joaquin Valley is recommended.

Ruttledge, Robert F., and Robin Hall Watt. THE DISTRIBUTION AND STATUS OF WILD GEESE IN IRELAND. Bird Study 5(1): 22-33, 6 maps. Mar. 1958.

Scott, Peter. A COLOURED KEY TO THE WILDFOWL OF THE WORLD. Wildfowl Trust, Slimbridge, Gloucestershire, Eng. 1-91 p., 23 col. pl. + thumbnail sketches. Revised 1957. Price not stated.

A paper-bound book of 8.5 x 5.5 x 0.3 in. that contains small, colored illustrations of all kinds of waterfowl of the world. Males, females, and subspecies are depicted. Ranges are stated on pages facing plates. The text helps in identification by grouping birds according to size, shape, bill, color, bill color, voice, and behavior. The book is not a key in the strict sense, but it is a useful guide inasmuch as it brings together in a handy booklet pictures, ranges, and identification points for all waterfowl.

Stewart, Paul Alva. THE WOOD DUCK, AIX SPONSA (LINNAEUS), AND ITS MANAGEMENT. Ph.D. thesis, Ohio State U. 372 p. 1957. [From long abstract in Dissertation Abstracts 18(6).]

Nest boxes with and without predator guards gave no significant difference in nesting success. Boxes with elliptical entrances were too favored by starlings. Boxes with entrance holes in lids were less used by ducks than other boxes were. Boxes on small streams were used less than those on river, ponds, or lake. Size and survival of broods varied but little with habitat. Wood ducks were easily trapped in small funnel traps baited with corn. Females could be removed from nest for banding without desertion. Local movements were discussed in detail. [This section published; see WR 92: p. 84.] Adult ?? returned to nesting area in successive years; young ?? nested near their hatching places. Males did not return to former nesting sites or hatching places. Counts of pairs and broods were so variable that no indication of population status was obtained. It is suggested that, if used at all, river floats and brood counts should be limited to a series of floats made on successive days in late Apr. or early May. Nesting box checks in conjunction with roosting flight counts are recommended. Data are presented on body weight, growth rate, body temperature, and speed traveled by different means of locomotion. Of 2,458 wood ducks banded, 63% were shot within 1 year after banding. The mean annual mortality rate for all years was 38%. One bird lived 13-14 years.

Stewart, Paul A. (Ind. Dept. Cons., 311 W. Wash. St., Indianapolis.) LOCOMOTION OF WOOD DUCKS. Wilson Bul. 70(2): 184-187. June 1958.

Summary: "1. Day-old ducklings when pressed swam an average of 0.9 foot per second or 0.6 of a mile per hour. 2. Day-old ducklings remained submerged a maximum of 13 seconds. One swam 16 feet under water. 3. One day-old duckling skittered over the water at the rate of 8.5 feet per second or 5.8 miles per hour. An adult male in the flightless stage of the postnuptial molt skittered at the rate of 14.0 feet per second or 9.5 miles per hour. 4. Three Wood Ducks at 3-4 weeks of age ran a maximum of 10.4 feet per second. The longest strides were 12.5 inches. The maximum running speed was 12 feet per second or 8.2 miles per hour by a bird 6-7 weeks of age. 5. The average flight speed of eight Wood Ducks soon after being released was 31.2 miles per hour. 6. Four Wood Ducks in flight made 7 to 7.5 wing beats per second, moving forward approximately 6.5 feet with each wing beat."

Stotts, Vernon D. (Box 44, Stevensville, Md.) THE BLACK DUCK (ANAS RUBRIPES) IN THE UPPER CHESAPEAKE BAY. Proc. 10th Ann. Conf. SE. Assn. Game & Fish Comms.: 234-242. 1956 (1957).

Detailed, quantitative report on incubation, hatching, renesting, and productivity. Renesting was of great importance, for early-season nest losses were high. "If nest mortality can be held to a minimum until the majority of the primary nests are well into incubation, the chances for success are increased manyfold with the result that more and larger broods are produced." Forty-nine of 147 nests were successful; 374 eggs, or 84.6%, hatched, for an av. of 7.6 per

nest. Counts of class III broods av. 6.9; thus brood size was reduced by flight stage by only 0.7. Figures suggest brood mortality of 9.2%. Although only 33.3% of all nests were successful, 62.0% of breeding population produced a brood. Number of young that reached flight stage was 4.3 per breeding pair.

Stotts, Vernon D. (Md. Game Comm.) THE TIME OF FORMATION OF PAIRS IN BLACK DUCKS. Md. Cons. 35(4): 11-15, 5 figs. July 1958.

Report of research on Chesapeake Bay. Pairing reached a peak in April, when 87.8% of black ducks were in pairs. Sharp decline of pairing in summer brought this figure to 3% in August. A gradual rise to 15.1% occurred by Nov. 17. By early March, 50% of the ducks were paired. Trapped and shot birds were examined to see when adults were flightless and when young matured. Half the adult ♂♂ passed the flightless stage by mid-July and all of them by Sept. 1. These points were reached by adult ♀♀ about Sept. 1 and late Oct. Young ♀♀ matured in some respects about 1 month earlier than young ♂♂. Of all young, half assumed nuptial plumage by the last week of Sept. and 80% did so by late Oct. Penes of young began to mature when birds were about 5 months old, but probably were not completely mature until Jan. or Feb., when birds were at least 8 months old. All evidence suggests that young contribute little to pairing in the fall, but that adults begin to pair soon after passing the stage of molt in which they are flightless. Many black ducks are paired at the time of hunting season, and most of them are adults--the birds that would be the most efficient nesters next year.

Ticehurst, N. F. THE MUTE SWAN IN ENGLAND. ITS HISTORY AND THE ANCIENT CUSTOM OF SWAN-KEEPING. Cleaver-Hume Press, 31 Wright's Lane, Kensington, London W. 8. xiii + 133 p., 31 pl. 1957. 35s, cloth. [From Auk 75(3).]

Yancey, Richard, Morton Smith, Herb Miller, and Larry Jahn. (Box 107, Ferriday, La.) WATERFOWL DISTRIBUTION AND MIGRATION REPORT (MISSISSIPPI FLYWAY STATES--SEPT. 1, 1956 - JAN. 15, 1957). Proc. 11th Ann. Conf. SE. Assn. Game & Fish Comms.: 105-114. 1957 (1958).

A report on numbers, migration routes, and seasonal and geographic distribution of waterfowl in the flyway. A general discussion of findings is followed by sections that take up data for individual species.

Yeager, Lee E., editor. OUTLINE OF THE CENTRAL FLYWAY WATERFOWL MANAGEMENT PLAN. Central Flyway Council. iii + 47 p. June 1958. Processed by US F&WS regional office, Albuquerque, N. M. Copies available on request from Central Flyway Representative, P. O. Box 1306, Albuquerque, N. M.

This is the long-range plan adopted by state and federal agencies. It "is an outline--a means to an end--which presents the principles, policies and objectives of waterfowl management in the flyway. The outline is but a guide--more detailed procedures will be developed when the component parts of the Central Flyway waterfowl management program are initiated." Part I discusses future problems of waterfowl and the organization of flyway personnel. Part II, "Principles, policies, and objectives," explains the major objectives; considers the relation of population levels to mortality factors; outlines what should be done in acquiring and managing breeding, migration, and wintering habitats; and tells how regulations are decided upon. Part III, "The program," takes up specific types of needs and states the approach that is to be used toward each. These needs include: preservation and development of breeding areas for ducks and geese, preservation and development of migration and wintering habitats, habitat-value surveys, surveys of crop damage, surveys of breeding and wintering waterfowl for purpose of setting regulations, study of migration patterns, study of hunter success, and enforcement. These major topics sound conventional, but the "Outline" contains much interesting material on details of policy and on approaches to given problems. It is also interesting because it represents the thinking of many experts on the broad background of waterfowl problems and on just what policy should be taken on each subproblem.

CRANES, RAILS, SHOREBIRDS

Bock, Walter J. A GENERIC REVIEW OF THE PLOVERS (CHARADRIINAE, AVES). Bul. Mus. Comp. Zool., Harvard Coll. (Cambridge, Mass.) 118(2): 25-97, 6 figs. Mar. 1958. Price not stated.

A new classification based on study of anatomy and habits. Zoogeographic considerations are discussed.

Coulson, J. C., and E. White. (U. of Durham, Eng.) OBSERVATIONS ON THE BREEDING OF THE KITTIWAKE. Bird Study 5(2): 74-83, 1 graph. June 1958.

Provides data on: growth of a colony that nests on a warehouse and other buildings at North Shields, Northumberland, Eng.; growth of coastal colonies in Britain; incubation period; fledging period; clutch size; breeding success; growth of young in broods of various sizes; success of broods of different sizes.

Cullen, J. M. (Oxford U., Eng.) PLUMAGE, AGE AND MORTALITY IN THE ARCTIC TERN. Bird Study 4(4): 197-207. Dec. 1957.

Goodbody, Ivan M. THE BREEDING OF THE BLACK-HEADED GULL. Bird Study 2(4): 192-199, 1 fig. Dec. 1955.

Sheldon, Wm. G., Frederick Greeley, and John Kupa. (U. Mass., Amherst.) AGING FALL-SHOT AMERICAN WOODCOCKS BY PRIMARY WEAR. J. Wildl. Mgt. 22(3): 310-312, 1 fig. July 1958.

The purpose was to develop a method of aging fall-shot American Woodcocks (Philohela minor) by examining wear on primary wing feathers. Based on molt patterns of 453 woodcocks captured during summer with Japanese mist nets, it was determined that juveniles of the year do not molt primary feathers. Of 146 wings of known-age fall-shot woodcocks from Wis. and New England, 95% were aged correctly by examination of wear on outer primaries. The best primaries to indicate age are primaries 8, 9, and 10; these are the last ones molted by adults. Tips and distal edges of juvenile primaries show more wear and are characterized by v-shaped notches on ends of barbs. Tips of adult primaries show even wear, with ends of barbs either square, or with a very shallow v-shaped notch, or unworn with fine, feathery tips.--Authors.

Timmermann, G. STUDIEN ZU EINER VERGLEICHENDEN PARASITOLOGIE DER CHARADRIIFORMES ODER REGENPFEIFERVÖGEL. TEIL 1: MALLOPHAGA. Parasit. Schriftenreihe (VEB Gustav Fischer Verlag, Jena, Germany) 8: 1-204, 95 figs. 1957. [From review by E. Eisenmann, Auk 75(3).]

In German. "A study of the mallophaga found on Charadriiformes. The mallophaga known to parasitize this group are first treated by genera, indicating the various birds on which they have been found; then there is a discussion of the phylogenetic implications in each major group of the Charadriiformes, and the affinities of most genera, separately considered." Eisenmann's review goes on to mention some of these findings in phylogeny, certain of which are contrary to present arrangements.

Ytreberg, Nils-Jarle. (U. Oslo.) CONTRIBUTION TO THE BREEDING BIOLOGY OF THE BLACK-HEADED GULL (LARUS RIDIBUNDUS L.) IN NORWAY. Nytt Mag. Zool. [Oslo] 4: 5-106, illus. 1956. [From Biol. Abs. 32(9).]

See very long author's summary in Biol. Abs. 32(9).

OTHER BIRDS

Armstrong, Wm. H. NESTING AND FOOD HABITS OF THE LONG-EARED OWL IN MICHIGAN. Mich. State U. (E. Lansing), Publ. of Mus., Biol. Ser. 1(2): 61-96, 2 pl. June 1958. Available on exchange or request to Museum.

Long-eared Owls in Mich. breed chiefly in s. part of state. Some of these owls migrate, others appear to be resident. Breeding may be in coniferous or deciduous trees. All 5 winter roosting areas observed were in coniferous stands. Courtship is described. Two nests were 27 and 25 ft. high and were in crow and hawk nests. Eggs, laying, and incubation are described. Care of young and changes in development and behavior of young are described. Calls are discussed in connection with activities. Food habits are considered on the basis of about 2,079 pellets from 5 areas. Microtus was chief food, Peromyscus a poor second. Other small mammals and small birds of several species were eaten occasionally.

Data are given on weights and measurements of pellets. Number of prey animals per pellet av. 1.57. Number of pellets per owl per day in winter av. 1.4. Mice of 1 area were tagged in effort to measure effect of owl predation. The rate of predation was not more than 0.2% per day of the total mouse population and not more than 0.5% per day of the Microtus population. The rate of predation may have been lower than this, but not higher.

Broley, Charles L., and Joseph C. Howell. THE PLIGHT OF THE AMERICAN BALD EAGLE. Aud. Mag. 60(4): 162-163, 171, 2 figs. July-Aug. 1958.

Broley, who has done a vast amount of eagle banding on the w. coast of Fla., reports that reproduction began to fall off in 1947. In the 100-mi. strip along the coast from Tampa s. to Englewood, Broley found that 103 young were reared from 56 nests in 1946. By 1957, only 8 young were reared from 7 nests. The main trouble was not scarcity of breeders--it was failure of efforts to reproduce. Broley believes that 80% of Fla. bald eagles are sterile. He suspects that the cause may be insecticides picked up by the eagles in catching fish killed or made sluggish by these poisons. By 1958, adult eagles were scarce. Immatures were reported as very rare in several parts of e. U. S. Broley recommends a thorough scientific study of the nonproductive eagles. Howell, whose eagle work has been chiefly on the e. Fla. coast, agrees that eagles are declining on both coasts, but much more rapidly on the w. coast than on the e. coast. He attributes the decline to development and drainage and recommends more sanctuaries around known breeding areas.

Davis, Irby L. (Cornell U., Ithaca, N. Y.) ACOUSTIC EVIDENCE OF RELATIONSHIP IN NORTH AMERICAN CROWS. Wilson Bul. 70(2): 151-167, 4 figs. June 1958.

Summary: "Audio-spectrographic analyses of typical calls of various species of North American crows were made and the results presented. It was found in the cases studied that the Sinaloa Crow had the highest pitched voice of all the species, whereas the Tamaulipas Crow had the lowest. The similarity of the form of the voice of the Tamaulipas Crow to that of the American Raven was pointed out. The Sinaloa Crow was proposed as a new species, Corvus sinaloae, from Escunapa, Sinaloa, Mexico." Morphological characteristics of the taxa are also considered.

Drinkwater, Howard. (Old Rd., Whitehouse, N. J.) BLACK-CROWNED NIGHT HERONS USING BILL MOTION TO LURE PREY. Wilson Bul. 70(2): 201-202. June 1958.

Fevold, H. R., and John J. Craighead. (U. Utah, Salt Lake City.) FOOD REQUIREMENTS OF THE GOLDEN EAGLE. Auk 75(3): 312-317. July 1958.

Conclusions: "The ratio of the weight of food consumed by the Golden Eagle, expressed in per cent of its average body weight, varies inversely with respect to both the body weight of the individual bird and the environmental temperature. An adult female required an average daily ration during the fall and winter of 308 grams and two juvenile males required 262 and 266 grams respectively during the same seasons. The per cent of average body weight eaten per day by the Golden Eagles lay between 5.5 and 6.6. The smaller Goshawk consumed 14 per cent of its average body weight during the cold weather period... The data presented, when related to other vital statistics of diet, raptor-days, and average prey weights, can be used to estimate the number of prey animals of various species required to maintain these raptors in their environment."

Fischer, Richard B. (Cornell U., Ithaca, N. Y.) THE BREEDING BIOLOGY OF THE CHIMNEY SWIFT CHAETURA PELAGICA (LINNAEUS). N. Y. State Mus. & Sci. Serv. (Albany 1), Bul. no. 368. 1-141 p., 23 photos, 6 graphs. Apr. 1958. $1.25, paper.

Readable research report on nest sites, return to breeding area, effect of weather on migration dates, longevity, lack of external sexual characters, weights, temperatures, general behavior, display, mating, nests, size and number of eggs, attentive periods, incubation, food, care of young, growth, break-up of family, ectoparasites, and related subjects. Comparisons with published data on this and other swifts are made throughout.

Graber, Jean Weber. A BIOECOLOGICAL STUDY OF THE BLACK-CAPPED VIREO (VIREO ATRICAPILLUS). Ph.D. thesis, U. Okla. 216 p. 1958. [From abstract in Dissertation Abstracts 19(2).]

An extensive field study was made to find out why this bird is so rare and local. Factors that did not seem to be responsible were disease, parasites, food habits, predation, low productivity, and length of life. The factor that was thought to be responsible was the bird's narrow habitat requirement. "Poor adaptability appears to be the prime factor in limiting distribution, and this is probably inherent in the genetic makeup of the species."

Howard, Walter E. (U. Calif., Davis.) FOOD INTAKE AND PELLET FORMATION OF A HORNED OWL. Wilson Bul. 70(2): 145-150. June 1958.

An adult Bubo virginianus was kept and fed for 4 months. The paper presents a detailed account of types and weights of food as well as number and weights of pellets. The owl preferred small prey animals to large ones. More and larger pellets were produced when small prey was eaten; the reason was that less roughage was ingested when meat was eaten from large animals. In a 75-day period, about 8,706 grams of food was eaten, or about 116 grams per day. This was equal to about 10% of the owl's weight. In this 75-day period, 55 pellets were formed, which means an av. of 1.36 days per pellet. An av. pellet represented some 158 grams of food. Pellets were weighed 8 years later in air-dry condition. Their weights varied from 0.4 to 18.0 grams and av. 5.36 grams. The bird was not injured by feeding on rodents killed by 1080, which supports statements that birds are less affected by 1080 than mammals are. It may be of significance in this connection that the owl seldom ate intestines of ground squirrels.

Kilham, Lawrence. (7815 Aberdeen Rd., Bethesda, Md.) SEALED-IN WINTER STORES OF RED-HEADED WOODPECKER. Wilson Bul. 70(2): 107-113, 5 figs. June 1958.

"...describes the systematic way in which these woodpeckers harvest and store acorns, then seal their stores from view, apparently as protection against theft by other animals. Closely guarded winter territories, which will be the subject of a second report, afford additional protection. Two observations suggest that the birds are closely dependent on the oaks. First, pin oak acorns make up a large part of their winter stores and, second, Red-headed Woodpeckers were absent from the area in the winter of 1953-1954 when the acorn crop failed."

Kilham, Lawrence. (7815 Aberdeen Rd., Bethesda 14, Md.) PAIR FORMATION, MUTUAL TAPPING AND NEST HOLE SELECTION OF RED-BELLIED WOODPECKERS. Auk 75(3): 318-329, 3 figs. July 1958.

McAllister, Nancy M. (Mus. Zool., U. Mich., Ann Arbor.) COURTSHIP, HOSTILE BEHAVIOR, NEST-ESTABLISHMENT AND EGG LAYING IN THE EARED GREBE (PODICEPS CASPICUS). Auk 75(3): 290-311, 1 fig., 4 photos. July 1958.

Many aspects of behavior are described on the basis of study in B. C. These grebes lay and abandon eggs before nests are fully built. Clutches vary from 1-6, av. 3.48. The bird is an indeterminate layer, but replaces only a limited number of lost eggs. There is considerable synchronization in the beginning of egg laying among grebes of a colony, especially in small colonies.

Mountfort, Guy. THE HAWFINCH. New Naturalist Series. Wm. Collins, Sons & Co., London. xii + 176 p., 8 pl. 1957. 18s., net. [From review by Landsborough Thomson, Nature, Aug. 16, 1958.]

A fine monograph on the biology of an elusive but interesting British bird. Among the topics treated are: flight, coloration, stealth, aggressiveness, courtship displays, voice, nesting, food and feeding, distribution, and migration. The large bill, massive skull, and powerful jaw muscles are "related to the habit of cracking cherry stones and olive kernels, a feat which the author's collaborators have shown to involve crushing loads ranging from 60 to 159 lb.--and this in a bird weighing a couple of ounces!"

Muir, R. C. CALLING AND FEEDING RATES OF FLEDGED TAWNY OWLS. Bird Study 1(3): 111-117, 1 fig. Sept. 1954.

Mumford, Russell E., and Richard L. Zusi. (Mus. Zool., U. Mich., Ann Arbor.) NOTES ON MOVEMENTS, TERRITORY, AND HABITAT OF WINTERING SAW-WHET OWLS. Wilson Bul. 70(2): 188-191, map. June 1958.

Myres, M. T. (U. of B. C., Vancouver.) THE EUROPEAN STARLING IN BRITISH COLUMBIA: 1947-1957. Occas. Pap. B. C. Prov. Mus. 11: 1-60, illus. 1958. [From long author's summary in Biol. Abs. 32(9).]
History, distribution, and status of Starling in B. C.

Nero, R. W., F. W. Lahrman, and F. G. Bard. (Sask. Mus. Nat. Hist., Regina.) DRY-LAND NEST-SITE OF A WESTERN GREBE COLONY. Auk 75(3): 347-349, 6 photos. July 1958.
Unfavorable conditions apparently forced grebes to nest on land at Old Wives Lake, Sask., in more than 1 year. Nesting success apparently was low and the birds' feet were in poor shape. The birds proved, however, that they could run and walk much better than previously suspected.

Newman, B. G. (Dept. Engin., U. Cambridge, Eng.) SOARING AND GLIDING FLIGHT OF THE BLACK VULTURE. J. Exp. Biol. 35(2): 280-285, 4 figs. June 1958.
Aeronautical analysis.

Newman, Donald L. (14174 Superior Rd., Cleveland Heights 18, Ohio.) A NESTING OF THE ACADIAN FLYCATCHER. Wilson Bul. 70(2): 130-144. June 1958.
Detailed observational study.

Sandeman, Pat W. THE BREEDING SUCCESS OF GOLDEN EAGLES IN SOUTHERN GRAMPIANS. Scottish Nat. 69(3): 148-152. 1957. [From Biol. Abs. 32(8).]
Area studied consisted of 2,750 square miles in Scottish Highlands, of which about 40% was arable land. Survey lasted 7 years; 14 pairs of Aquila chrysaëtos occupied this area and 27 young were reared. Eagles bred twice as successfully on deer-sheep ground as on ground used for grouse and sheep. Lower breeding success on some areas was due largely to human interference. Tables on breeding success and interference are given.--Lucile Walton.

Southern, H. N., Richard Vaughan, and R. C. Muir. THE BEHAVIOUR OF YOUNG TAWNY OWLS AFTER FLEDGING. Bird Study 1(3): 101-110, 3 figs. Sept. 1954.

Southern, Wm. E. (614 Prairie St., Clare, Mich.) NESTING OF THE RED-EYED VIREO IN THE DOUGLAS LAKE REGION, MICHIGAN. Jack-Pine Warbler 36(3): 104-130, 1 photo. Sept. 1958.
Part I of detailed study of nesting and associated behavior.

Stein, Robert Carrington. (Ursinus Coll., Collegeville, Pa.) THE BEHAVIORAL, ECOLOGICAL AND MORPHOLOGICAL CHARACTERISTICS OF TWO POPULATIONS OF THE ALDER FLYCATCHER, EMPIDONAX TRAILLII (AUDUBON). N. Y. State Mus. & Sci. Serv. (Albany 1), Bul. no. 371. 1-63 p., 5 figs. July 1958. 75¢, paper.
The two song-types behaved as distinct species at Ithaca, N. Y. They were similar but not identical in habitat preference. They differed significantly in song, in reaction to songs, and in nests, eggs, color, and several body measurements. Continental distribution of these song-types is not yet completely worked out. Apparently the ranges are partly distinct, partly overlapping. Interbreeding does not seem to occur, at least around Ithaca. Possible taxonomy is discussed.

Stenger, Judith. (U. of B. C., Vancouver.) FOOD HABITS AND AVAILABLE FOOD OF OVENBIRDS IN RELATION TO TERRITORY SIZE. Auk 75(3): 335-346, 1 graph. July 1958.
Foods were invertebrates taken from forest floor. They were taken approximately in proportion to their availability. "The weight of invertebrates per litter sample within the territory varied inversely with the size of the total territory established during the breeding season. This correlation held within habitats, as well as among habitats. The weight of invertebrate food on the forest floor increased during the breeding season to reach a peak during the... nestling period of the Ovenbird chicks." These results are in harmony with Lack's view that a bird's breeding season is adaptively adjusted to the season when food for the brood is abundant.

OTHER BIRDS--Continued

Tuck, Leslie M. (Can. Wildl. Serv., St. John's, Newf.) PRESENT DISTRIBUTION AND POPULATION OF THE STARLING IN NEWFOUNDLAND. Can. Field-Nat. 72(3): 139-144, map. July-Sept. 1958.

Watson, Adam. THE BREEDING SUCCESS OF GOLDEN EAGLES IN THE NORTH-EAST HIGHLANDS. Scottish Nat. 69(3): 153-169. 1957. [From Biol. Abs. 32(8).]
A survey of the population of Aquila chrysaëtos was carried on from 1944 till 1957. 12 adult pairs occupied 220 square miles and their hunting areas overlapped. These owned a total of about 64 eyries; 19 eyries were in pine trees and rest on rocks. Average number of young leaving a successful nest was 1.3. No young were reared from at least 1/3 of the known clutches. Variation in breeding success from year to year is related to food supply of eagles.--Lucile Walton.

REPTILES AND AMPHIBIANS

Alcala, Angel C. PHILIPPINE NOTES ON THE ECOLOGY OF THE GIANT MARINE TOAD. Silliman J. 4(2): 90-96, illus. 1957. [From Biol. Abs. 32(7).]
Factors responsible for rapid increase in numbers and spread of Bufo marinus in the Philippines are discussed. Observations on Negros Island have not shown that it competes with, or drives out, any local amphibian. Population on Negros is apparently declining in numbers. One reason may be a disease characterized by extreme emaciation and death.--Author.

Anderson, Paul K. (MVZ, U. Calif., Berkeley.) THE PHOTIC RESPONSES AND WATER-APPROACH BEHAVIOR OF HATCHLING TURTLES. Copeia 1958(3): 211-215, 5 figs. Aug. 1958.

Auffenberg, Walter. (U. Fla., Gainesville.) FOSSIL TURTLES OF THE GENUS TERRAPENE IN FLORIDA. Bul. Fla. State Mus., Biol. Sci., 3(2): 53-92, 15 figs. June 1958. 60¢.
Includes much information on variation, relationships, and history of living forms, especially of the T. carolina group.

Bleakney, Sherman. (Natl. Mus. Can., Ottawa, Ont.) POSTGLACIAL DISPERSAL OF THE TURTLE CHRYSEMYS PICTA. Herpetologica 14(2): 101-104, map. July 1958.
Discussion of distributional history, with new map of ranges of the 4 subspecies. C. p. marginata is considered to be of hybrid origin.

Brown, E. E. (Davidson Coll., Davidson, N. C.) FEEDING HABITS OF THE NORTHERN WATER SNAKE, NATRIX SIPEDON SIPEDON LINNAEUS. Zoologica 43(2): 55-71. Aug. 1958.
An unusually good paper on foods and feeding biology. It reports in detail on the stomach contents of 207 snakes from N. Y. and Mich. Fishes comprised 79% of food items, with minnows, darters, sculpins, and suckers predominating. Amphibians were 21% of the items. Foods of young and mature snakes were similar in type. Newts were rejected; pickerel frogs were not eagerly accepted--both have some repellency. Crayfish were not found in snakes studied and apparently are not eaten regularly in large parts of the snake's range. No reptiles, birds, or mammals were found to have been eaten and must be unusual foods. Methods of capturing prey are analyzed. A skilled form of groping is often used under water, but sight is also important. The snake may be diurnal or nocturnal, depending largely on temperatures. Maximum size of a meal is about 40% of the snake's weight, but usual feedings are smaller. Data are given on food consumption and growth of experimentally fed snakes of various ages. Experimental data are also given on speed of digestion.

Bundy, Roy E., and John Neess. (Dickinson U., Teaneck, N. J.) COLOR VARIATION IN THE ROUND-TAILED HORNED LIZARD, PHRYNOSOMA MODESTUM. Ecology 39(3): 463-477, 5 figs. July 1958.
Detailed experimental study of correlation between color of soil and color of lizard. Color of backs of adults did correlate with soil color. Such correlations were weak or absent for half-grown or smaller lizards. "Lizards kept on backgrounds of ground black cinders or white sand for periods of several weeks showed strong changes in albedo and weaker changes in color, which could

be at least in part explained as resulting from adherence of substrate material to the skin. It was not possible to demonstrate that lizards are able to change color over periods of 24 hours when subjected to various changes in temperature, light intensity or background color, although some combinations of the various levels of these variables were able to produce changes in albedo. The latter were most obviously related to changes in temperature, cold usually being followed by bleaching..." Results of the study make "it impossible to conclude that the distinctly colored populations represent incipient ecological subspecies, or even that the local color-correlation is the result of genetic differences among the local population."

Carpenter, Charles C. (U. Okla., Norman.) REPRODUCTION, YOUNG, EGGS AND FOOD OF OKLAHOMA SNAKES. Herpetologica 14(2): 113-115. July 1958.
Brief but useful notes on field biology of 22 species.

Carr, Archie. (U. Costa Rica, San José.) NOTES ON THE ZOOGEOGRAPHY OF THE ATLANTIC SEA TURTLES OF THE GENUS LEPIDOCHELYS. Rev. Biol. Trop. 5(1): 45-61, illus., maps. 1957. [From Biol. Abs. 32(7).]
The sea turtle L. kempi has an extensive range in coastal waters of the U. S., and in parts of Fla. is abundant as a seasonal resident. All known individuals are sexually immature; the breeding area is not known. The present paper suggests the necessity of assuming a distant origin for the N. Am. population, examines fragmentary evidence bearing on the corollary assumption of migratory movement, and proposes the coast of nw. Africa as a possible nesting site. Spreading into Am. waters may occur via the Gulf Stream system. New records extend the range of the genus to n. Mauretania and into the Mediterranean.--Auth. summ.

Clarke, Robert F. (Kans. State Teach. Coll., Emporia.) AN ECOLOGICAL STUDY OF REPTILES AND AMPHIBIANS IN OSAGE COUNTY, KANSAS. Emporia State Res. Studies 7(1): 1-52 p., 15 figs. Sept. 1958.
Describes area and its major habitats, presents annotated list of species, and gives detailed discussion of relation of availability of each common species to season, temperature, and precipitation. Data are also presented on percentages of association between species, and between species and habitats.

Cohen, Nathan W., and Walter E. Howard. (Modesto Junior Coll., Modesto, Calif.) BULLFROG FOOD AND GROWTH AT THE SAN JOAQUIN EXPERIMENTAL RANGE, CALIFORNIA. Copeia 1958(3): 223-225, 3 figs. Aug. 1958.
When breeding ponds went dry in summer, development from egg through metamorphosis was completed in about 6-7 months. Adults sought refuge from drying ponds in wells, springs, and rocky crevices. Good populations were maintained through the years. Tabulation of foods of 300 frogs suggests that almost all sorts of small animals were eaten, and that beetles were most important. Graphs show relationship of weight to snout-vent and hind-foot measurements, and of the last 2 to each other.

Conant, Roger. (Zool. Soc. Philadelphia.) A FIELD GUIDE TO REPTILES AND AMPHIBIANS OF EASTERN NORTH AMERICA. Houghton Mifflin Co., 2 Park St., Boston 7, Mass. xviii + 366 p. "More than 1100 illustrations, including 405 in full color." 1958. $3.95.
A field guide so good and so up to date one marvels that it has been done. This new member of the Peterson series treats all herptiles, species and subspecies, of the U. S. and Canada e. of the 100th Meridian with a thoroughness and practicality few field guides have approached. Many authorities assisted in its preparation. Some identifications are difficult even for professionals, but in general, if an identification can be made in the field, this guide tells you how. For identifying an animal, one goes first to the plates, then to the maps, and finally to the descriptions and comparisons. These are conveniently cross-referenced. The hundreds of illustrations were made from life and show comparably posed individuals. Most of the pictures are excellent; very few are too small to show details. The half tones are even better than the color plates. There are also text figures to show diagnostic details. The set of range maps is complete and good. The diagnostic descriptions and comparisons are well worked out. Both young (not larvae) and adults are considered and natural

variation is allowed for. Voices of frogs are well described. Usual size range and record size are stated for each species. Brief notes on habits and habitat are given for each species. Glossary and end-paper illustrations explain necessary technical characteristics. Introductory chapters discuss use of book, collecting methods, care of captives, and snake bite. The back of the book has not only the convenient set of maps and a good index, but a selected list of general references and lists of regional and state references. The book is so well illustrated, authoritative, and well prepared that it is easy to see why more than 6 years were spent on its preparation. The price is quite reasonable considering number of pages and quantity and quality of illustrations.

Cook, Fannye A. (Miss. Game Comm. Mus., Jackson.) SALAMANDERS OF MISSISSIPPI. Surv. Bull. Miss. Game and Fish Mus. 6. 1-28 p. 1957. [From Biol. Abs. 32(8).]

A key to the 6 families of salamanders found in Miss. with a brief description of the families, genera, species, and their distribution within the state.--S. B. Simpson, Jr.

Duellman, Wm. E. (Wayne State U., Detroit, Mich.) A MONOGRAPHIC STUDY OF THE COLUBRID SNAKE GENUS LEPTODEIRA. Bul. Am. Mus. Nat. Hist. 114(1): 1-152, illus. 1958. [See abs. in Biol. Abs. 32(8).]

Fitch, Henry S. (U. Kans., Lawrence.) NATURAL HISTORY OF THE SIX-LINED RACERUNNER (CNEMIDOPHORUS SEXLINEATUS). U. Kans. Publ., Mus. Nat. Hist., 11 (2): 11-62, 9 figs. Sept. 1958.

Good monograph based chiefly on much work at U. Kans. Nat. Hist. Reservation. Among the subjects discussed are: trapping, marking, habitat, temperature relationships, movements, burrows, foods, reproduction, growth, tail regeneration, molt, predators, parasites, numbers, and behavior. This lizard, the most northern of its group, occurs in rather xeric, often sandy, habitats. It tends to disappear as areas become well vegetated. Racerunners prefer high body temperatures and spend much of the year in hibernation. They are strictly diurnal, and retreat to burrows that they may dig themselves. Although very swift, individuals usually remain in home ranges of about 1/4 acre. They do not maintain territories, which is surprising, but males fight. Eggs are laid June-Aug. Some ?? lay 2 or more clutches a season. Young breed when less than a year old and less than 1/2 full weight. Av. clutch is 3.1 eggs. Incubation takes about 2 months. Young hatch over a long time span, so young of various sizes are present. They attain adult size in second year. Racerunners are favorite hosts of the common chigger. Prey animals are mostly small insects, spiders, and snails. Prey need not move to be found, and often is located by smell and dug out. In one small colony, population density varied from 40-72 per acre. Sex ratio was about 1:1. The population contained 7 annual age groups. Annual natural mortality took about half the individuals of each age group.

Hansen, Keith L. (Stetson U., DeLand, Fla.) BREEDING PATTERN OF THE EASTERN SPADEFOOT TOAD. Herpetologica 14(2): 57-67, graphs. July 1958.

Useful review of available information and theoretical interpretation.

Hendrickson, John R. (U. Malaya, Singapore.) THE GREEN SEA TURTLE, CHELONIA MYDAS (LINN.) IN MALAYA AND SARAWAK. Proc. Zool. Soc. London 130(4): 455-535, 10 pl., 15 figs. June 1958.

Long important paper based on 4 years of study in major breeding areas. Major topics are: breeding behavior, egg laying, production of eggs, clutch size, frequency of laying, hatching of young, travel of young to sea, temperature relationships of eggs, growth rate, predation, external parasites, hatchery methods, exploitation, and management. Green turtles are rigidly protected by law and tradition; only their eggs are harvested, and enough are allowed to hatch to maintain the population. Relatively few beaches are used for egg laying; these beaches could be improved artificially. Thousands of adult ?? were tagged. Only 3.7% nested on islands they had not used before. Annual egg production from 3 Sarawak islands av. nearly 2 million. There was no non-breeding season in Sarawak, but there was a distinct peak in June-Aug. each year. Individual ?? nested 6-7 times per season at intervals of about 10 days. 8,147 clutches av.

104.7 eggs per clutch. Return in 1956 of many turtles tagged in 1953 indicated presence of a 3-year breeding cycle. Temperatures in nests varied no more than about 2°C. Temperatures in nests increased with metabolic heat of development. Weights and measurements were reported. Author concluded that Asian Green Turtles probably matured in 4-6 years. Heaviest predation on young was by Ghost Crabs and sharks. Sharks also attacked adults, and might well be controlled and utilized. A parasitic barnacle apparently caused tumors. Hatchery procedures are advisable for maintenance of Green Turtle stocks, but the big question is whether utilization should be for eggs only, as in study area, or for meat and fat, as in Am. and elsewhere. Author shows convincingly that heavy egg harvesting can be supported by the stock with great nutritional value to the human population, whereas slaughter for flesh reduces the stock and is neither economical nor sound conservation. If turtle soup we must have, it should be a rare luxury, profits from which should be plowed back into management of Green Turtle populations.

Hock, Raymond J. (Arctic Health Res. Center, Anchorage, Alaska.) ALASKAN ZOOGEOGRAPHY AND ALASKAN AMPHIBIA. Sci. in Alaska 1953. p. 201-206, 1 map. 1956.

Provides key, range statements, and discussion of factors limiting distributions.

King, Wayne, and James V. Griffo, Jr. (U. Fla., Gainesville.) A BOX TURTLE FATALITY APPARENTLY CAUSED BY SARCOPHAGA CISTUDINIS LARVAE. Fla. Ent. 41(4): 44. 1958. [See abs. in Biol. Abs. 32(8).]

Lindsay, Hague Leland, Jr. ANALYSIS OF VARIATION AND FACTORS AFFECTING GENE EXCHANGE IN PSEUDACRIS CLARKI AND PSEUDACRIS NIGRITA IN TEXAS. Ph.D. thesis, U. Texas. 171 p. 1958. [From abstract in Dissertation Abstracts 18(6).]

The species produce fertile hybrids in the laboratory but behave as distinct species in the field. They are somewhat different in ecological preferences, breed at different times, and have different calls. Study of morphological variation revealed no significant differences that could not be explained on the basis of small differences between local populations.

Logier, E. B. S. (Roy. Ont. Mus., Toronto.) THE SNAKES OF ONTARIO. U. of Toronto Press. 94 p., illus. 1958. $4.95. [From review by Sherman Bleakney, Can. Field-Nat. 72(3).]

Written for children but suitable for adults throughout e. Canada. "The book contains a wealth of information and the organization and presentation are excellent. There are twenty pages devoted to such topics as feeding, reproduction, hibernation, usefulness of snakes and other related subjects. Pages 23 to 62 present a description of Ontario's sixteen species of snakes. The account of each species is neatly limited to two facing pages, and includes an illustration of the animal, a small map depicting its entire range in North America and a detailed one showing its distribution in Ontario. The accompanying and carefully prepared text covers the size and structure, color, habits and habitat, and distribution of snakes in Ontario." Most of the illustrations, both colored and black-and-white, were drawn by author. "The titles of the eight appendices are as follows: Synoptic List of Ontario Snakes, The Scientific Name, Key to Ontario Snakes, Determination of Sex, Keeping Snakes as Pets, Collecting and Preserving of Specimens, Glossary and Rattlesnake bite... All cases of fatalities in Canada have been due to persons who deliberately attempted to handle a rattlesnake."

Pettus, David. (Colo. State U., Ft. Collins.) WATER RELATIONSHIPS IN NATRIX SIPEDON. Copeia 1958(3): 207-211. Aug. 1958.

N. s. clarki is a snake of saline coastal waters. N. s. confluens, which intergrades with clarki, is a fresh-water snake and cannot live long in saline water. Studies were made to find the basis of the differences. Permeability of skin was similar in both. No differences in kidney structure were noted. Snakes of both races preferred fresh water in tests. "It is concluded that clarki can maintain water balance through the utilization of preformed water from the body of its prey plus water derived from oxidative metabolism. Moreover, clarki will not drink water of 30 0/00 [parts per thousand] salinity, whereas confluens

will drink it and subsequently succumb to its effects. Because of this behavior trait confluens, a fresh water race, cannot occupy the salt marsh habitat where clarki regularly occurs."

Savage, Jay M. (U. of S. Calif., Los Angeles.) THE IGUANID LIZARD GENERA UROSAURUS AND UTA, WITH REMARKS ON RELATED GROUPS. Zoologica 43(2): 41-54, 6 figs. Aug. 1958.
Study of morphology and classification of many iguanid genera, with special attention to the groups allied to, or once thought allied to Uta.

Straw, Richard M. (L. A. State Coll., Los Angeles, Calif.) EXPERIMENTAL NOTES ON THE DEEP SPRINGS TOAD BUFO EXSUL. Ecology 39(3): 552-553. July 1958.
Summary: "Experiments with tadpoles of Bufo exsul indicate that heat death ensues between 41° and 42°C. Similar experiments with adults show them to be slightly less tolerant of heat than the tadpoles if confined to water, but able to withstand air temperatures up to 46°C. if evaporation cooling is possible. The adults appear able to survive a loss of water from their bodies equivalent to (approaching) 40%, which amounts to slightly over half of their total water content. These data may be interpreted as adaptive with reference to the occurrence of the toad in isolated springs in a desert valley."

Tihen, J. A. COMMENTS ON THE OSTEOLOGY AND PHYLOGENY OF AMBYSTOMATID SALAMANDERS. Bul. Fla. State Mus., Biol. Sci., 3(1): 1-50, 11 figs. June 1958. 55¢.
Provides a large amount of information on anatomy, relationships, and history of all taxa from subfamilies through species.

Turner, Frederick B. (Wayne U., Detroit, Mich.) LIFE-HISTORY OF THE WESTERN SPOTTED FROG IN YELLOWSTONE NATIONAL PARK. Herpetologica 14(2): 96-100. July 1958.
Habitat, emergence, aggregations, breeding sites, voice, amplexus, egg laying, development, and hibernation.

## FISHES

Robins, C. Richard. CHECK LIST OF THE FLORIDA GAME AND COMMERCIAL MARINE FISHES / INCLUDING THOSE OF THE GULF OF MEXICO AND THE WEST INDIES, WITH APPROVED COMMON NAMES. Fla. Bd. Cons. (Tallahassee), Educ. Ser. no. 12. 1-44 p. Revised ed., Mar. 1958.
Revision of list prepared in 1949 by L. R. Rivas. It is a systematic list with scientific and preferred common names, and brief statements of general distribution. Secondary common names are listed for some species. Has index and selected bibliography of 11 titles. [Note that this paper covers only game and commercial species of salt water. For complete list of Fla. fishes with more information on distribution and longer bibliography, see Briggs, WR 91: 111.]

## INVERTEBRATES

Chamberlin, Ralph V., and Richard L. Hoffman. (U. Utah, Salt Lake City.) CHECKLIST OF THE MILLIPEDS OF NORTH AMERICA. US Natl. Mus. Bul. 212. iii + 236 p. 1958. $1.00, paper from Supt. Documents.
The present work includes about 6 times as many species as Bollman's catalog of 1893. It is a very useful annotated list that has a discussion of classification, keys to higher groups, and occasional taxonomic notes. The synonymy is more helpful than in some checklists. For each species or ssp., data are given on type, type locality, and known range. For each genus, data are given on generotype, range, and number of species. The volume includes a long bibliography and an index.

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